START

0012340

9100241

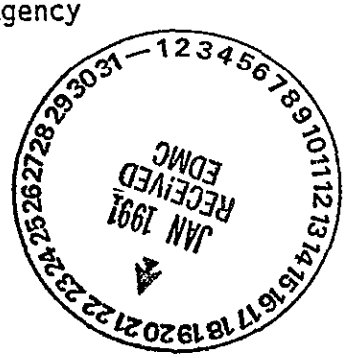
Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

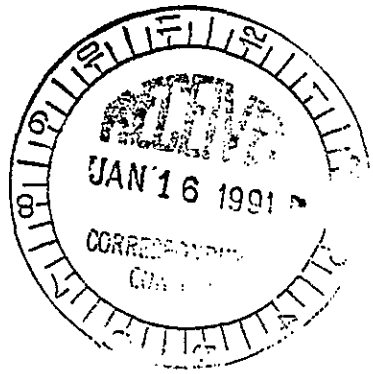
91-ERB-010

JAN 10 1991

Mr. Paul T. Day
Hanford Project Manager
U. S. Environmental Protection Agency
712 Swift, Suite 5
Richland, Washington 99352

Mr. Timothy L. Nord
Hanford Project Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711





Dear Messrs. Day and Nord:

EXPEDITED RESPONSE ACTION (ERA) - PROJECT DESCRIPTIONS

Enclosed are the project descriptions for the 300 Area Process Trench ERA and the 618-9 Burial Ground ERA. Also enclosed is the draft Project Plan for the 200 West Area ERA. These three documents fulfill the commitment to submit project descriptions by January 9, 1991.

Project Plans for all three ERAs are scheduled to be completed in the next few weeks (as shown on the schedules provided to you in our December 6, 1990, submittal). The draft ERA Project Plan for the 200 West Area Action has not undergone final review within Westinghouse Hanford Company (WHC). In order to expedite the review process, the document is being concurrently reviewed by WHC and the Department of Energy, Richland Operations Office. Any comments on this document which are received by January 16, 1991, will be considered in the preparation of the final document. Please contact Mr. Mike Hagood, WHC, directly on (509) 376-9664, if you have comments.

If you have any questions, please contact Julie Erickson on (509) 376-3603.

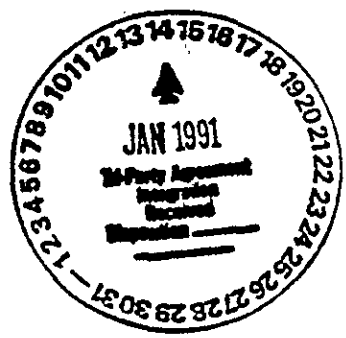
Sincerely,

Steven H. Wisness
Hanford Project Manager

ERD:JKE

Enclosures: As stated

cc: G. Rothwell, Ecology w/encl.
W. Johnson, WHC w/o encl.
B. Veneziano, WHC w/encl.



9102070213

Interim Response Action Project Description
618-9 Burial Ground

Rev 0, January 9, 1991

1.0 Introduction

On October 18, 1990, an agreement in principle between the United States Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) was signed. This Agreement states that three candidate projects will be considered for interim response actions (IRA). The agreement states that the projects under consideration include, but are not limited to:

- o 618-9 Burial Ground Remediation
- o 300 Area Process Trenches Sediment Removal
- o 200-West Area Carbon Tetrachloride Treatment

Proposals were submitted to Ecology and the EPA on November 26, 1991 for their review of the technical basis, costs, and feasibility of implementing these projects. The 618-9 Burial Ground IRA proposal was accepted by the regulating agencies, and DOE has been requested to continue with the project by preparing a detailed project plan to assist in the preparation of an Action Memorandum. This information is contained in a letter dated December 20, 1990 (Attachment 1). This letter also requests that non-intrusive site investigations begin at the site for further definition of trench and contents.

The IRA at the 618-9 Burial Ground will proceed in two phases. One phase, site characterization through to drum liquid removal, is considered "time critical", the second phase, soil and liquid treatment/disposal will proceed according to IRA procedures. A time-critical IRA does not require an engineering evaluation/cost analysis prior to project begin, however, a full project plan will be provided by February 11, 1991 (as indicated in the information package provided December 6, 1990). The engineering evaluation of treatment/disposal methods for the soil and/or liquids will be initiated when sufficient site characterization identifies the type and extent of contamination requiring treatment.

This document provides a preliminary project description to describe the general actions which will be taken for the implementation of the 618-9 Burial Ground IRA. The complete project plan is due, as discussed above, on February 11. Changes to the project description may be required due to comments from regulatory agencies or internal safety and quality reviews.

2.0 Project Description

2.1 Background

Throughout Hanford Site history, prior to legislation regarding disposal of chemical waste products, some drummed chemical wastes were disposed by burial in trenches. One of these trenches is the 618-9 Burial Ground. This burial ground is suspected to contain approximately 5000 gallons of uranium contaminated organic solvent.

The 618-9 Burial Ground is composed of a single 200-foot long trench that is approximately 18 feet wide 8 feet deep. The trench, which is located 600 Area, just west of the 300 Area, was operated from 1950 to 1965. The Hanford Waste Information Data System (WIDS) indicates that approximately 100 55-gallon drums of uranyl nitrate hexahydrate contaminated organic solvent (hexone, NPH/Tributyl phosphate) from the 321 Building were disposed of in this trench (Attachment 2). Oral interviews with former site employees, and the lack of historical documentation cause the data to be suspect. The total uranium content is estimated in WIDS to be approximately 10 tons. The trench has been removed from service and backfilled. While uranium has been detected in the 300 Area groundwater, the 618-9 Burial Ground does not appear to be its source. Currently, hexone is <u>not</u> being detected in the 300 Area groundwater well monitoring network. The groundwater table underlying the site is about 50 feet below the surface, and the Columbia River is about one mile to the east.

2.2 Project Description

Due to the uncertainties at the site, the project plan will be written to take into account different possible scenarios. This plan considers the possibility of intact or leaky, upright or jumbled drums. Initial safety precautions will be conservative and assume, as worst case, that full drum of uranium saturated hexone are buried.

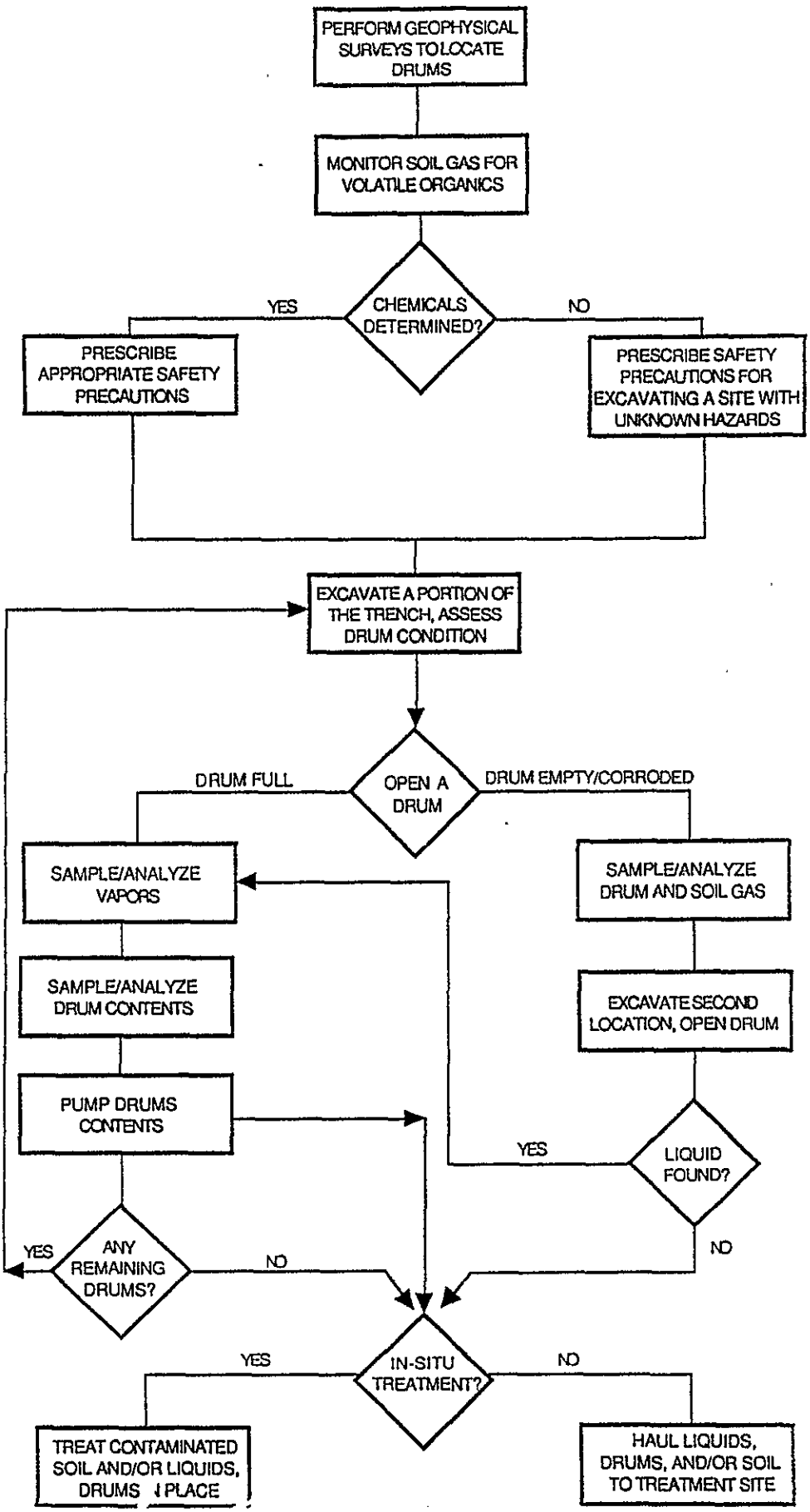
Figure 1 shows the procedures planned for the interim action, pending peer review.

Geophysical mapping (groundpenetrating radar, magnetometer) and soil gas surveys are underway. From the geophysical surveys the trench boundaries and drum locations will be further defined. Soil gas surveys may indicate the type of volatile organic buried in the trench, and may also indicate if the drums have leaked.

After these surveys are complete, and the data has been analyzed, the first drum will be excavated. Overburden will be removed from an eight foot wide section by machine excavation to within one foot of the tops of the drums. Final excavation of the drums will be carried out by hand, or with a vacuum device from a platform.

A remote drum opening tool will be used to open the drums, if intact, to obtain a sample. The sample will be analyzed for chemical composition and

618-9 BURIAL GROUND INTERIM RESPONSE ACTION PLAN



radionuclide content. Any liquids found will be pumped into on site storage for later treatment. If the drums are corroded, and no liquids remain, the drums will be sampled and disposed appropriately in phase two of the project. Excavation and drum pumping will proceed in a manner that will only expose a few fresh drums at a time to minimize potential risks.

After the liquids have been safely removed, the first phase of this IRA is complete. The surrounding soils will be sampled to determine if any contamination exists, and if so, the extent of the contamination. If high levels of soil contamination are present, the soil will be excavated for later treatment. A full analysis of engineering alternatives of soil and drum liquid treatment will be explored to prepare an Engineering Evaluation and Cost Analysis, as required for IRA projects.

ATTACHMENT 1

United States
Environmental Protection
Agency

Region 10
Hanford Project Office
712 Swift Boulevard, Suite 5
Richland WA 99352

EPA

December 20, 1990

Steven H. Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550, A6-95
Richland, Washington 99352

Re: 618-9 Burial Ground Interim Response Action

Dear Mr. Wisness:

The U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) have reviewed the Interim Response Action (IRA) proposal for the 618-9 Burial Ground enclosed with your December 6, 1990 letter. Based upon that review, we believe that this project could successfully mitigate a threat (or potential threat) to the environment posed by the buried drums of uranium-contaminated hexone. We encourage you to proceed with detailed planning, including any non-intrusive field work necessary, to implement the project. For the purposes of this project, the EPA will be the lead regulatory agency and Ecology will be the support agency.

A final proposal will be required and must include sufficient detail for us to be able to prepare an Action Memorandum. The Action Memorandum will be the mechanism by which we approve start of investigative field work, and any removal actions.

The following items need to be addressed in the final proposal:

- We consider this action to be time-critical. If we proceed with this action, the excavation and drum handling should be performed in as cool weather as possible (hexone has a reasonably high vapor pressure, it has a Flash Point of 73 degrees F, and a TLV of 50 ppm). Therefore, for safety reasons, it is important to start as soon as we are prepared.

- Contingencies should be outlined, with activation points specified. Examples are the different actions taken if the drums are sound vs if the drums are not sound and stop work points under different weather conditions.

- If recovered, hexone is moved "off-site" (on-site is defined as the area where the action is taking place and those adjacent areas necessary for implementing the remedy), it must be handled in accordance with all administrative and substantive requirements of RCRA and WAC 173-303. If the final disposition of the hexone is to treat it in the Hexone Storage and Treatment facility in the 200-West Area, DOE will have to work with Ecology to determine whether a revision to the Part A permit application for that unit must be submitted. If the final disposition is treatment on-site, permits are not required, although all the substantive requirements of all applicable regulations must be met.

- ARARs must be identified, as removal actions must attain ARARs to the extent practicable.

- Opportunities for public involvement must be identified. As a time-critical action, there is no Engineering Evaluation/Cost Assessment to issue for comment. Instead, we need to tailor a meaningful project specific public involvement process. As part of this effort, we suggest that a fact sheet be prepared for this IRA to be used at the next Tri-Party quarterly meeting scheduled for mid-January. Additionally, we are requesting a project description to be submitted on the IRA no later than January 9, 1991.

- According to the October 18, 1990 Agreement in Principle, the funding for this project is in addition to that identified to meet previously identified activities required by the Tri-Party Agreement.

If you have any questions on the above, please do not hesitate to contact either one of us. Additionally, we intend to maintain regular staff interaction, allowing for early identification of issues or concerns.

Sincerely,

Douglas R. Sherwood for

Paul T. Day
Hanford Project Manager
U.S. Environmental Protection Agency

R. D. Stanley for

Timothy L. Nord
Hanford Project Manager
Washington State Department of Ecology

cc: Willis Bixby, DOE
Roger Stanley, Ecology

Waste Information Data System
General Summary Report
January 9, 1991

SITE NAME: 618-9 [309]
ALIASES:
300 West Burial Ground [309]; 318-9 [17]

SITE TYPE: Burial Ground [309]
WASTE CATEGORY: Mixed Waste [309]
WASTE TYPE: Solid [309]

STATUS: Inactive [309] Pre-1980 [309]
START DATE: 1950 [309]
END DATE: 1954 ?1956 [309]? [NR]

OPERABLE UNIT: 300-FF-2 [329]
REG. AUTHORITY: CERCLA Past Practice [323]
DOE/RL PROGRAM: Radiation Areas Reduction [358]

This site is included in the Tri-Party Agreement Action Plan [329]

PNL Hazardous Ranking System Migration Score: 0.00 [309]

DESIGNATED AREA: 600 Area [309]
COORDINATES:
N55738 E11016, N55738 E10998, N55938 E11016, N55938 E10998 [309]
LOCATION:
~3/4 mi northwest of the 300 Area [17] and 1,500 ft southwest of the 618-7 site [NR]

GROUND ELEVATION: 400.00 feet above MSL [309]
WATER TABLE DEPTH: 58.00 feet below grade [309]

SITE DIMENSIONS:

Length:	200.00	feet [309]
Width:	18.00	feet [309]
Depth:	8.00	feet [309]

SITE DESCRIPTION:
The unit consists of a trench 18 to 20 ft wide by 140 ft long (surface dimensions). Adjacent to the trench is a mound of contaminated soil from the 303 Area that was covered over with 4 ft of clean soil [309].

WASTE TYPES AND AMOUNTS:
The site contains 55-gal drums of uranium-contaminated organic solvent (5,000 gal) from the 321 Building [309].

CLEANUP ACTIONS:
The unit was removed from service, backfilled, identified with markers, and stabilized [309].

ATTACHMENT 2

316-5 Process Trenches Interim Remedial Action Project Description

1.0 Introduction

Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Oil and Hazardous Substances Pollution Contingency Plan, the Resource Conservation and Recovery Act (RCRA), Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement), and the Agreement in Principle of October, 1990, the 300 Area (316-5) Process Trenches have been selected for an Interim Response Action (IRA). The purpose of the IRA is to reduce the potential for further environmental threats from the contaminants which have been discharged to the trenches.

The objective of the IRA is to remove readily accessible contaminants located in the trench soil from the driving head created by the liquid effluent discharged to the trenches.

The IRA activities will be conducted to provide minimal impact to the operable unit remedial investigation presently being conducted by the DOE.

1.1 Background

On October 18, 1990 an Agreement in Principle between the United States Department of Energy (DOE), the EPA, and the State of Washington was signed. The agreement states that initially, three candidate sites will be considered for Interim Response Actions. The agreement also states that the candidate sites under consideration would include, but not be limited to:

- 618-9 Burial Ground Remediation
- 300 Area Process Trenches sediment removal
- 200 West Area Carbon Tetrachloride treatment.

In accordance with the October 18, 1990 agreement, the DOE proposed the selected projects to the EPA and Ecology for review of costs, technical basis, and project feasibility. The projects which meet regulatory approval will then be proposed to the public for comment prior to issuance of final approval for initiating a specific project.

The proposed projects were selected following a limited evaluation of seven sites by DOE and EPA. The DOE proposed the three above mentioned candidate sites for primary consideration, with the remaining sites deferred for future consideration. The selection process for the seven sites was not intended to be a comprehensive evaluation of all potential sites at Hanford. A selection process was used to identify sites where an IRA will have merit. This selection process is currently under development for use in identifying future IRA sites.

2.0 Facility Description

The 316-5 Process Trenches, an active TSD unit, are located in the 300-FF-1 process liquid operable unit (Figures A and B) and above the 300-FF-5 groundwater operable unit. Both the operable units are categorized as CERCLA past practice units (DOE, et. al. 1989). The trenches are located near the western boundary of the 300-FF-1 Operable Unit, approximately 300 meters west of the Columbia River. The trenches are approximately 458 meters in length, 3.5 meters deep, 3 meters wide (bottom width) and 10 meters wide at the top of the trench. The parallel trenches are separated by an earth berm. The bottom of the trenches slope slightly to the north and are approximately 20 feet above the water table. There is a small (30 meters by 50 meters by 3 meters) depression located at the northwest corner of the west trench. The depression was recently (June, 1990) isolated from the west trench by an earth berm which was constructed to facilitate the placement of screens over the trenches.

The trenches, which are presently operated under a Resource Conservation and Recovery Act (RCRA) Interim Status Permit, were constructed and activated in 1975. Liquid effluent discharges to the trenches are estimated to range from 3000 liters per minute (lpm) to 4500 lpm, averaging 3500 lpm. During peak activities in the 300 Area, discharge rates up to 11,360,000 liters per day may have occurred. In 1985, administrative controls were instituted to reduce and eliminate discharges of hazardous wastes to the process trenches. The present effluent discharge consists of 1) purified or potable water; 2) equipment cooling water; 3) laboratories and research facilities waste water; and 4) precipitation, rain, and snowfall runoff. The potable water and equipment cooling water are estimated to account for 70 percent of the flow discharged to the trenches. Substances discharged to the trenches, prior to 1985, were both slightly radioactive and hazardous. The fuel fabrication activities conducted in the 300 Area may have been the most significant source of contaminants.

The routine effluent discharged to the trenches is not designated as a dangerous waste according to the procedure specified in the Washington Administrative Code (WAC), Chapter 173-303. Administrative controls which were implemented in 1985 require the effluent to meet drinking water standards.

In the future, the flow discharged to the trenches is expected to be greatly reduced. There also is the potential for construction of a facility to inspect and treat the waste stream prior to release to the environment.

The 300-FF-1 Operable Unit Work Plan (DOE/RL 88-31) provides information concerning potential and known contaminants in the trench soil.

3.0 IRA Activities

The activities associated with the IRA have been divided into three phases described as follows:

The first phase of the IRA is to develop the necessary documents required to perform the IRA. The documents include the following:

- NEPA Categorical Exclusion
- Plant Forces Work Review
- Project Plan
- Decommissioning Work Plan
  - Cultural Resources Review
  - Radiation Work Permit
  - Facility Safety Document(s)
  - Excavation Permit
  - HASP/HWOP
  - QAPP
- IRA Proposal

The second phase of the IRA will consist of the removal activity. Removal activities will consist of operations and maintenance type work to excavate accessible radioactive and hazardous contaminants which have been deposited in the bottom of the trenches. The excavation will occur in an active Treatment Storage and Disposal (TSD) unit. The contaminants in one trench will be removed while the second trench remains in operation receiving the process effluent. After removal activities in the first trench are completed, the effluent will be valved to that trench so the second trench can drain to allow removal activity to be initiated. The materials removed from the process trenches will be consolidated in the north end of the trenches or with similar wastes in the 316-2 North Process Pond. After waste consolidation, interim stabilization will be performed to prevent contamination from migrating until the Record of Decision selects the final cleanup method(s).

The work to be performed consists of removing approximately 5,000 cubic yards of radioactively and chemically contaminated soil from the 316-5 trenches. The material will be removed and transported with WHC earth moving equipment (e.g. backhoe, scraper, dragline, dump trucks, dredge, etc.). The soils will be placed in the north end of the trenches or the nearby inactive 316-2 pond and stabilized to prevent migration. The bird control netting and about 30 feet of fence will need to be temporarily removed to provide necessary accesses. The work will be performed consistent with the standard WHC practices for interim stabilization of waste sites and ditch maintenance. The potential exists for the equipment to become permanently contaminated.

The removal activity will be monitored for radioactive and hazardous constituents through the use of field instruments (e.g. portable XRF analyzer, health physics instruments, air monitors). After completion of the removal activities the equipment will be decontaminated in the trench area prior to final interim stabilization.

The final phase of the IRA will be the preparation of the final report of IRA activities.

4.0 Project Organization and Responsibilities

The project organization is graphically illustrated in Figure 1. The following narratives briefly describe the responsibilities of organizations involved in the IRA.

Environmental Engineering Remedial Action Section

Provides project management lead and coordinates technical resources for the IRA. Prepares, or causes to be prepared, the necessary documents to accomplish the IRA. Prepares a final report summarizing the IRA.

NEPA Documentation

Provides the support to ensure that the necessary NEPA documents required for the IRA are approved and in place.

Environmental Field Services

Prepare and provide approved industrial health and safety documents (eg. HWOP). Provide site safety officer and health monitoring during removal and related activities. Provide a letter report summarizing the health and Safety aspects of the IRA.

Industrial Safety and Fire Protection

Provides support to ensure applicable occupational health and safety requirements are appropriately addressed. Provide a letter report summarizing IFS&P activities during the IRA.

Quality Assurance

Provides support to verify that appropriate quality assurance requirements are addressed. Provide surveillance of the IRA as necessary.

Environmental Protection

Provides support to ensure compliance with environmental regulations and Hanford Site requirements.

Health Physics

Provides support to prepare and issue the necessary Radiation Work Permit (RWP), provides necessary HPT support during removal and related activities.

Hanford Restoration Operations/Decommissioning Engineering

Prepare and issue the decommissioning work plan which includes sampling for XRF analyses. Prepare necessary information for EE/CA. Obtain excavation permit, equipment, and supplies to conduct removal and related activities. Coordinate labor and equipment and initiate removal. Provide field supervision for the removal and related activities. Prepare summary letter report of the IRA removal and related activities.

Cultural Resources

Provide documentation and support necessary to obtain the excavation permit.

Facility Safety (Nuclear)

Prepare and issue and required facility safety document(s).

300 Area Landlord

Provides assistance as necessary to expedite any/all activities. Provide coordination with other projects in the area.

Regulatory Analysis

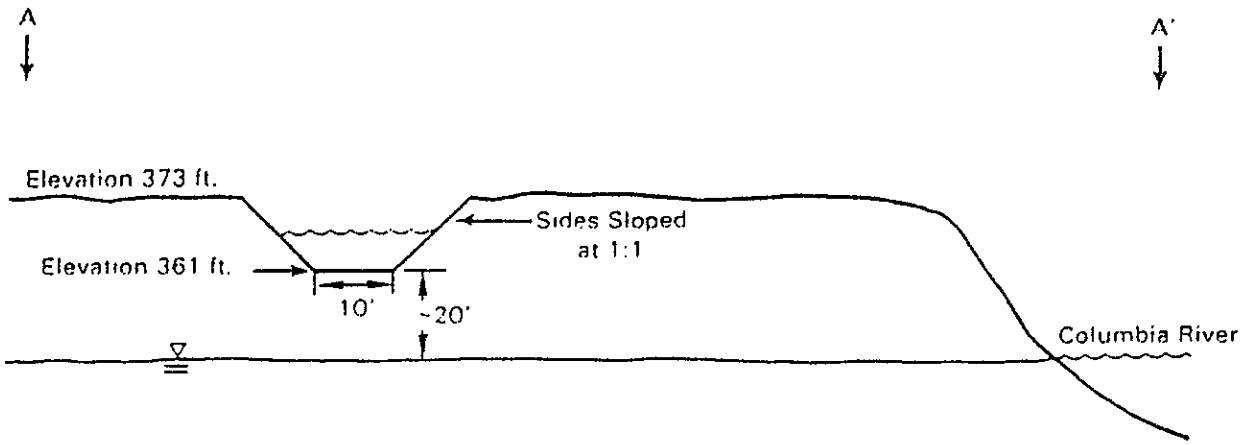
Assist in providing information and regulatory guidance on environmental regulations.

Environmental Projects

Assist in providing information concerning projects in the area.

Operation and Support Services

Provide support as necessary to Environmental Restoration/Decommissioning Engineering.



▽ Water Table

Elevations are in feet
above mean sea level

Not to Scale

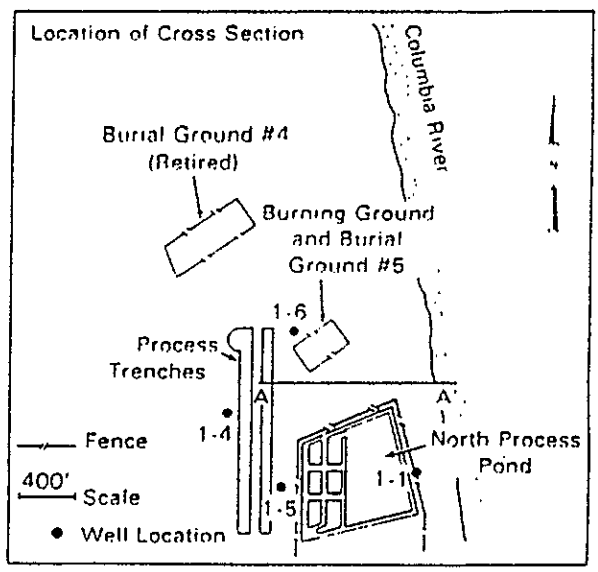


FIGURE A 316-5 PROCESS TRENCHES LAYOUT AND CROSS-SECTION

CLOSURE/POST-CLOSURE PLAN 300 AREA PROCESS TRENCHES (DOE 1985)

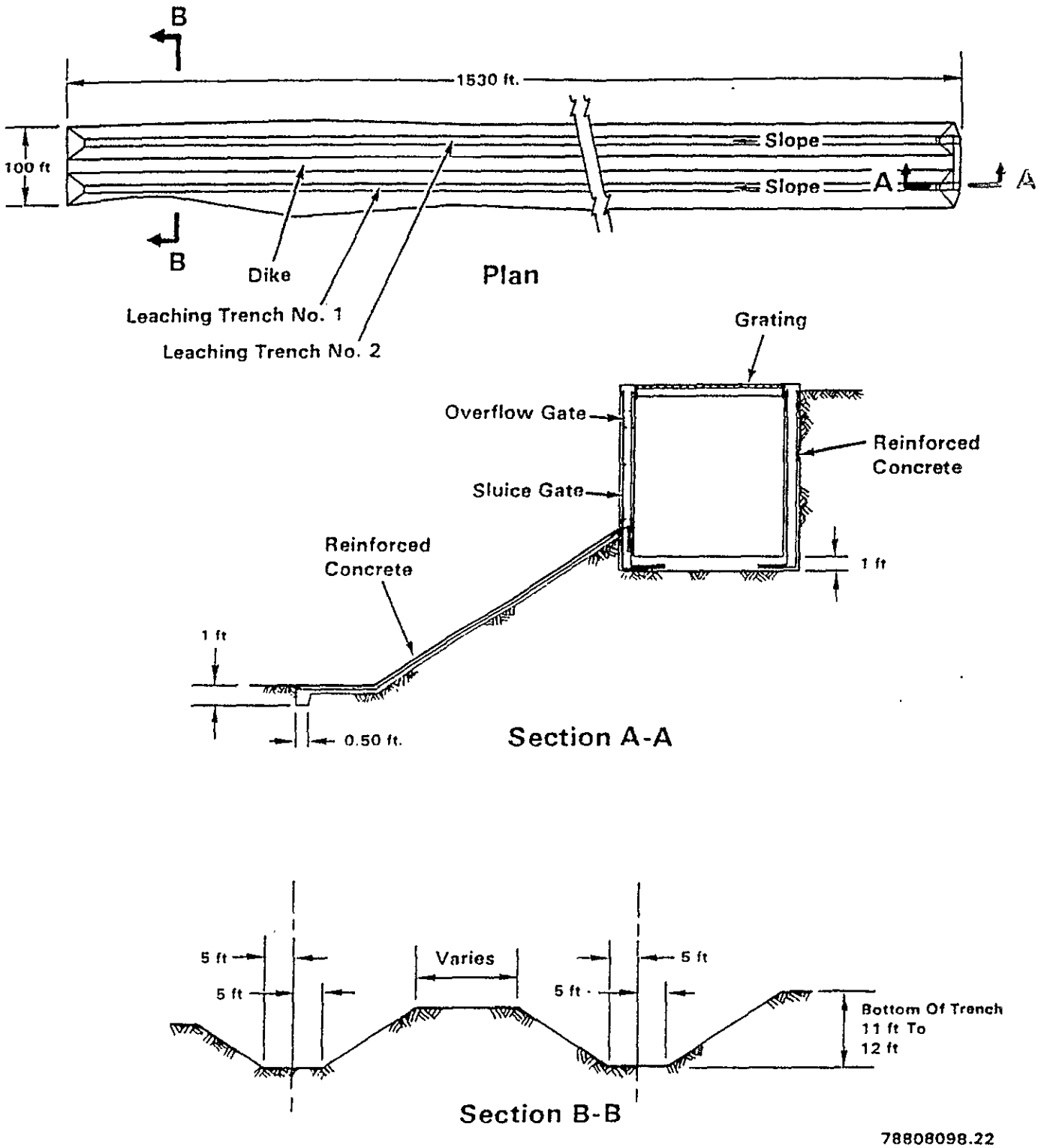


FIGURE B 316-5 CONSTRUCTION INFORMATION

9100233B RI
Attachment 3

200 WEST CARBON TETRACHLORIDE INTERIM RESPONSE ACTION PROJECT PLAN

200 WEST AREA CARBON TETRACHLORIDE

INTERIM RESPONSE ACTION

PROJECT PLAN

DRAFT

January 9, 1991

Westinghouse Hanford Company
Richland, Washington 99352

CONTENTS

ATTACHMENTS

EXHIBITS

1.0 INTRODUCTION

DRAFT

1.1 PURPOSE.

This document provides a description of the 200 West Area Carbon Tetrachloride Interim Response Action (IRA) Project, as requested by the December 20, 1990 letter from the U.S. Environmental Protection Agency (EPA) and the Washington Department of Ecology (Ecology) to the U.S. Department of Energy-Richland Operations Office (DOE-RL) (see Exhibit 1). The project plan includes a description of the site, a preliminary screening of remedial action technologies, site evaluation tasks to be performed, and brief descriptions of the IRA proposal, design, implementation, reporting, and project schedule information.

1.2 BACKGROUND

An IRA is a provision included in the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) that allows for expedited responses to be taken at waste sites where early remediation will prevent the potential for an imminent hazard to develop. The IRA is implemented according to the requirements outlined in the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) (Ecology et al. 1989, Part 3, Article XIII, Section 38), and in accordance with 40 CFR Part 300, Subpart E.

On October 18, 1990, an Agreement in Principle between DOE, EPA, and Ecology was signed (Exhibit 2). This agreement states that three candidate projects will be considered for expedited response actions. The agreement states that candidate projects under consideration include, but are not limited to:

- 618-9 Burial Ground
- 300 Area Process Trenches
- 200 West Area Carbon Tetrachloride.

On December 6, 1990, DOE-RL submitted (see Exhibit 3) the preliminary proposed interim response action summary packages which included a summary package on the 200 West Area Carbon Tetrachloride IRA. On December 12, 1990, Ecology responded with comments on the proposed 200 West Carbon Tetrachloride IRA (see Exhibit 4). On December 20, 1990, both the EPA and Ecology requested DOE-RL to proceed with detailed planning to implement the 200 West Area Carbon Tetrachloride IRA (see Exhibit 1).

1.3 GENERAL CONCEPT OF IRA

The goal of the 200 West Area Carbon Tetrachloride IRA is to minimize or stabilize the spread of carbon tetrachloride within the unsaturated soils (vadose zone) beneath, and away from principal carbon tetrachloride disposal sites in the 200 West Area in the vicinity of Z Plant. This action would be

conducted until final cleanup can be achieved through the implementation of the CERCLA process at the 200-ZP-1 and-2 operable units.

The IRA will not be performed on the Carbon Tetrachloride found in the groundwater in the 200 West Area due to the complexity of recovering the carbon tetrachloride in an IRA time frame and its anticipated lesser chance of success when compared to remediation of the vadose zone.

The process for implementing the 200 West Area carbon tetrachloride IRA will follow the format outlined in the Tri-Party Agreement, and the Hanford Site Past Practice Investigation Strategy Document (Draft, October 1990). The IRA is considered to be non-time critical, meaning that a planning period of at least 6 months exists prior to initiation of the activity. Implementation of a non-time-critical IRA requires an engineering evaluation/cost assessment to be conducted and submitted to the lead regulatory agency (EPA). In the case of the Hanford Site strategy for performing an IRA, the engineering evaluation/ cost assessment will be contained in an IRA proposal which will provide the additional details necessary for implementing the alternative chosen. The IRA proposal is preceded by an initial site evaluation phase and followed by the design and implementation of the IRA selected.

2.0 SITE CHARACTERISTICS

2.1 PHYSICAL CHARACTERISTICS

2.1.1 Liquid Waste Disposal Facilities

Aqueous and organic waste from plutonium recovery processes operated at Z Plant in the 200 West Area were discharged primarily to three liquid waste disposal facilities: the 216-Z-1A Tile Field, the 216-Z-9 Trench, and the 216-Z-18 Crib (Figure 1).

The 216-Z-1A Tile Field has surface dimensions of approximately 200 by 360 ft. The side walls of the 19-ft-deep excavation were sloped inward, resulting in a floor dimension for the facility of approximately 115 by 275 ft. The floor of the excavation was covered by a 4-ft-thick cobble layer with a minimum north-to-south surface slope of 1%. A herringbone pattern of 8-in-diameter clay pipe, comprised of a 260-ft-long central distributor pipe and seven pairs of 70-ft laterals, was placed on this cobble layer. The 98- by 260-ft rectangular area covered by the piping system was then overlain with 0.5 ft of cobbles and 5 ft of sand and gravel. A sheet of 0.02-in. polyethelene covered by 1 ft of sand and gravel was also added to the facility. The surface of the tile field appears to be about 8 ft below grade. Effluent piping in the 216-Z-1A Tile Field is vitrified clay pipe; the central distribution pipe has a stainless steel pipe inside the clay pipe (Price et al. 1979; Owens 1981).

The base of the 216-Z-9 Trench is a 60- by 30-ft excavation, 21 ft deep. The surface is a 120- by 90- by 0.75-ft-thick concrete trench cover at ground level. Two 1.5-in. stainless steel pipes discharged liquid 17 ft above the trench bottom. The concrete pad is supported by six 23-ft-tall concrete columns. The site contains equipment from 1976-1978 mining operations (Owens 1981).

The 216-Z-18 Crib consists of five parallel excavations, 207- by 10- by 18-ft deep. A 300-ft-long, 3-in-diameter steel pipe runs east and west, bisecting the length of each excavation. Two 100-ft-long, 3-in-diameter, perforated, fiberglass-reinforced epoxy pipes exit each side of the above pipe in each excavation (two lines north, two lines south). The distribution pipes are 1 ft above the crib bottom in a 2-ft-thick bed of 1.5- to 3-in. gravel. The gravel is covered by a membrane barrier overlain by approximately 6 in. of sand. The excavation is backfilled to grade (Owens 1981).

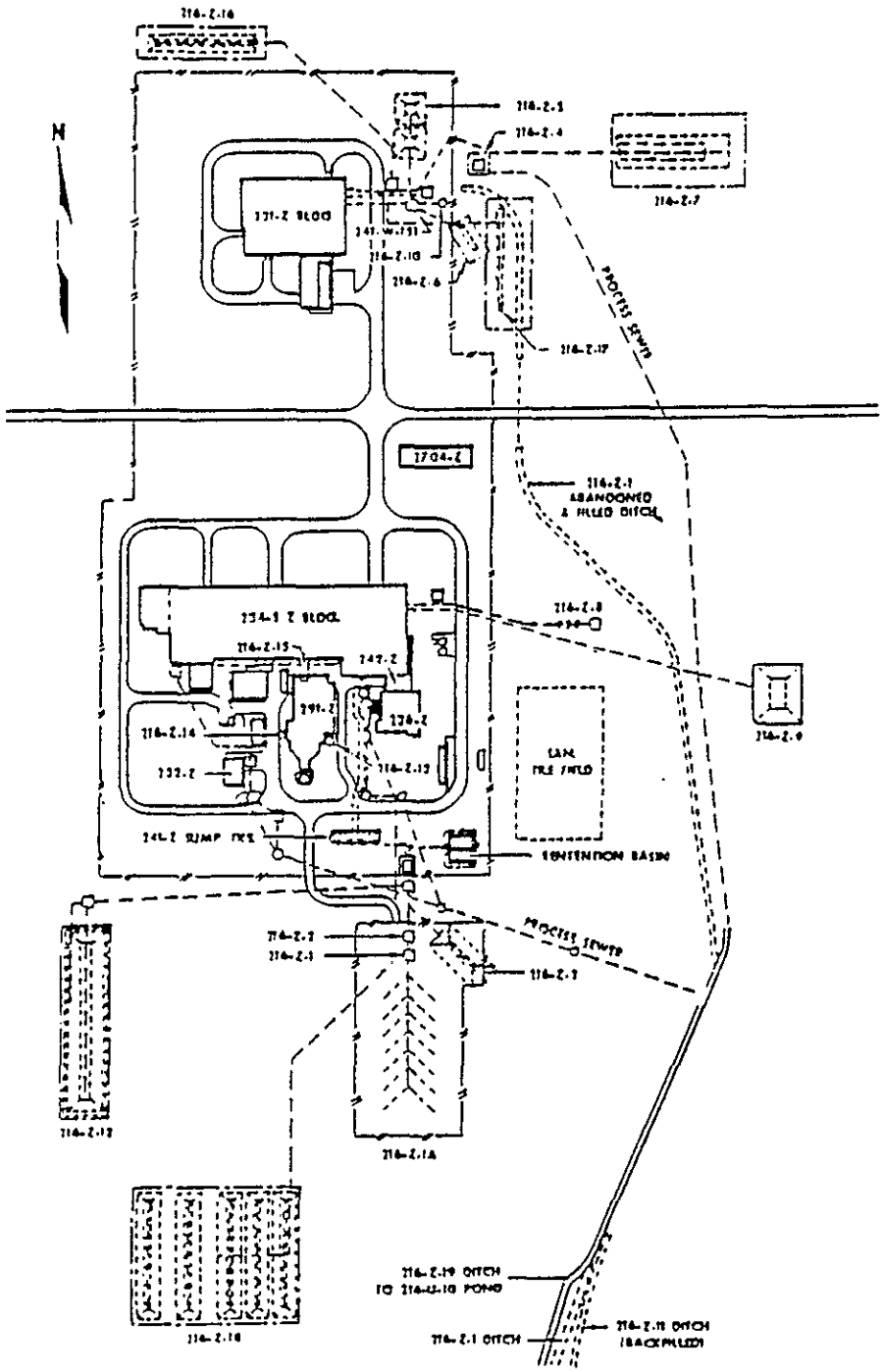


Figure 1. Z Plant Liquid Waste Sites.

2.1.2 Geology/Hydrogeology

The vadose zone underlying the area of carbon tetrachloride discharge facilities ranges in thickness from about 190 ft at the 216-Z-9 Trench to 215 ft at the 216-Z-18 Crib. A coarse-grained sand/gravel sequence underlain by a fine-grained sand/mud sequence (the Hanford formation) forms the uppermost unit. A narrow paleo-flood channel trends north-south through the Z Plant area toward 216-U Pond; this channel was cut into the fine-grained sequence and contains up to 130 ft of relatively unconsolidated gravels and sands (Last et al. 1989).

Underlying these sands and gravels is an unconsolidated, calcareous, fine sandy silt (early "Palouse" soil) which is 5 to 10 ft thick under the carbon tetrachloride discharge area. This unit thickens to the east, south, and west of Z Plant, but is not present in the northeast portion of 200 West Area.

The Plio-Pleistocene paleosurface underlying the silt is characterized by relatively high concentrations of calcium carbonate cement (8 to 30 wt%) and ranges from a gravelly sand to a sandy mud. The thickness varies from about 14 to 25 ft in the vicinity of Z Plant. The surface of this unit dips to the southwest across the 200 West Area but includes local undulations in the vicinity of Z Plant. The high cementation and laterally continuous nature of this unit may create a layer with relatively low permeability throughout the 200 West Area.

The fluvial-lacustrine Ringold Formation underlies the Plio-Pleistocene unit and overlies the Miocene Columbia River Basalt; the basalt generally provides the interface between the unconfined and confined aquifer systems. The silty-to-gravelly sand of the upper Ringold is discontinuous across the 200 West Area; it extends from the north as a narrow zone to just south of Z Plant, where it may be up to 22 ft thick. The middle Ringold unit is a sandy gravel with occasional discontinuous thin zones of laminated sand. The water table lies in its upper portion. This unit is generally 250 ft or more thick in the 200 West Area; the upper surface generally dips to the southwest, as do those of the underlying units.

On the average, field moisture contents of unsaturated sediments in 200 West Area range from 2 to 6 wt% (Last et al. 1989). Several locally occurring zones of increased moisture content below about 40 ft and within the Hanford formation may exist in the vicinity of Z Plant.

The unconfined aquifer is contained within the middle Ringold and underlying lower and basal Ringold units, which consist of fine-grained sequences underlain by a coarse-grained unit. The fine-grained sequences pinch out in the eastern portion of 200 West Area. The saturated thickness of the unconfined aquifer is about 230 ft thick underlying Z Plant.

Groundwater flow directions in the unconfined aquifer are generally radial outward from the southwestern portion of the 200 West Area primarily because of the continuing influence of the residual groundwater mound underlying the decommissioned 216-U Pond. Groundwater flows generally toward the north, northwest, and northeast under the carbon tetrachloride disposal sites. Based on tritium plume migration, Graham et al. (1981) estimated that

average groundwater travel times are 80 to 120 yr from the 200 West Area to the Columbia River.

2.2 NATURE AND EXTENT OF CONTAMINATION

2.2.1 Contaminant Sources

The aqueous waste stream, characterized as a high-salt aqueous waste, was primarily a concentrated (5M to 6M), acidic (pH ~ 1.0 to 2.5), sodium nitrate solution. In addition to the aqueous phase, organic liquids consisting of carbon tetrachloride (CCl_4), tributylphosphate (TBP), and dibutylbutylphosphonate (DBBP) occurred in saturation amounts in the aqueous phase and were also discharged separately in batches. Less than 5% of the volume of high-salt aqueous waste consisted of the organic component (Kasper 1982).

The 216-Z-9 Trench was built for the disposal of both organic and aqueous plutonium waste solutions from the Recuplex Plutonium Scrap Recovery Facility in the 234-5 Z Plant. The 216-Z-9 Trench received recuplex high-salt, aqueous waste and organic waste from July 1955 to June 1962. The total volume of liquid discharged was 4.09E+06 L. The recuplex inputs to the trench included: 109 metric tons of organic as 15-25% TBP in CCl_4, DBBP, and trace monobutylphosphate; and 54 metric tons of organic as "fab oil" (a mixture of 50% CCl_4/50% lard oil used as a cutting oil during the machining of plutonium) (Owens 1981).

In 1964, the 216-Z-1A Tile Field was reactivated to receive aqueous and organic waste from the Plutonium Reclamation Facility in the 236-Z Building and the 242-Z Waste Treatment and Americium Recovery Building. The tile field received approximately 5.2E+06 L of waste between June 1964 and June 1969 (Price et al. 1979). The amount of organic material being discharged to the tile field in 1967 was estimated to be: 80 vol% CCl_4/20 vol% TBP at a rate of 4,400 gal/yr; 70 vol% CCl_4/30 vol% DBBP at a rate of 6,600 gal/yr. Fab oil was not included in these estimates because of its intermittent processing and the relatively small volume involved at that time. In 1967, about 6,000 gal of fab oil remained in storage to be processed and routed to 216-Z-1A (Sloat 1967). If the rate of input of organic remained constant during the 5-yr period (1964-1969), the crib would have received about 245 metric tons of CCl_4.

The use of the 216-Z-1A Crib was terminated in 1969, and the waste stream was rerouted to the 216-Z-18 Crib. The 216-Z-18 Crib received a total of 3.86E+06 L of waste from June 1969 to May 1973 (Owens 1981). The hazardous chemical inventory in the waste identification data system (WHC 1990) indicates 260 metric tons of CCl_4, 15 metric tons of dibutylphosphate, and 22 metric tons of TBP were discharged to the 216-Z-18 Crib.

The chemical processes used to purify plutonium resulted in the production of actinide-bearing waste liquid; the primary radionuclide component of this liquid discharged to the CCl_4 liquid waste disposal sites was plutonium-239/240. The 216-Z-1A Crib received an estimated 57 kg of

plutonium; 216-Z-9 Trench received 48 kg; and the 216-Z-18 Crib received 23 kg (Owens 1981).

2.2.2 Groundwater Contamination

The CCl_4 groundwater contaminant plume, as defined by the 50 p/b contour (10 times the MCL of 5 p/b) in Evans et al. (1990), covers at least 2 mi^2, virtually all of the 200 West Area north and east of the CCl_4 discharge area. Maximum concentrations in the upper part of the aquifer (8,700 p/b at well 299-W15-16 in 1990) occur approximately 1,500 ft downgradient from the 216-Z-1A and 216-Z-18 cribs. A concentration of 5 p/b was observed in a companion well (299-W15-17) screened in the lower portion of the aquifer.

In addition to carbon tetrachloride, a chloroform plume of more limited extent appears centered between Z Plant and the 216-Z-9 Crib. The maximum observed concentration of chloroform exceeds 650 p/b; the maximum contaminant level is 100 p/b. Evans et al. (1990) suggest that the chloroform is probably a degradation product of the carbon tetrachloride, either through radiolytic processes prior to disposal or through natural transformation processes in the subsurface. Other groundwater contaminants indicated in Evans et al. (1990) which currently intersect the CCl_4 plume include: cyanide, fluoride, hexavalent chromium, trichloroethylene, nitrate, strontium-90, tritium, technetium-99, iodine-129, and uranium.

2.2.3 Soil Contamination

In 1979 at the 216-Z-1A Tile Field, the highest measured concentrations of plutonium-239/2240 (4E+04 nCi/g) and americium-241 (2.5E+03 nCi/g) occurred in sediments located immediately beneath the crib. The concentration of actinides in sediments generally decreased with depth beneath the crib, with the exception of silt-enriched horizons and boundary areas between major sedimentary units. The maximum vertical penetration of actinide contamination (defined by the 1E-02 nCi/g isopleth) was located approximately 100 ft below the bottom of the crib. The estimated lateral extent of contamination is located within a 30-ft-wide zone around the crib (Price et al. 1979). Of the three CCl_4 disposal sites, the 216-Z-1A Tile Field received the largest volume of waste liquid and the largest amount of plutonium. The plutonium and americium is therefore assumed to be held within the upper 100 ft of sediment underlying the 216-Z-9 Trench and 216-Z-18 Crib.

Carbon tetrachloride vapors have been detected during drilling at numerous sites in the 200 West Area. For example, anecdotal reports indicate that CCl_4 vapors were encountered above the Plio-Pleistocene layer ("caliche layer") during drilling of the 216-Z-1A Tile Field after its retirement in 1969; that vapors were encountered below the caliche layer during remediation of wells at the 216-Z-9 Crib in 1987; that vapors are encountered below the caliche layer during drilling of Resource Conservation and Recovery Act of 1976 (RCRA) wells near U and T Tank Farms in 1990.

3.0 PRELIMINARY SCREENING OF ALTERNATIVES

3.1 INTRODUCTION

This section provides a preliminary evaluation of remedial action alternatives for conducting an interim remedial action to prevent or minimize further spread of carbon tetrachloride contamination to the groundwater in the vicinity of the 200 West Area. Results from this preliminary evaluation will be used to better focus site evaluation tasks (Chapter 4.0) and provide input into the development of the IRA Proposal (see Chapter 5.0). This evaluation is not intended as a formal screening as conducted in the engineering evaluation/cost assessment (see Chapter 5.0).

3.2 IRA GOAL AND EVALUATION

Transport of carbon tetrachloride in the groundwater around the 200 West Area is currently believed to be due principally to the downward diffusion of vapor phase carbon tetrachloride through the vadose zone. The goal of the remedial action is therefore to remove carbon tetrachloride vapor from the unsaturated zone to prevent further contamination of the groundwater. Direct cleanup of the groundwater will not be considered further, as groundwater remedial cleanup alternatives would be relatively less efficient, more costly, and could not be performed in the timeframe of an IRA.

The general response actions considered for the Carbon Tetrachloride IRA are:

- no action
- institutional
- containment
- collection and treatment
- in situ treatment.

These response actions are screened using feasibility, appropriateness, and cost as the selection criteria.

A "no action" alternative does not meet the goal of the IRA and is therefore not considered further. An "institutional" action alternative is not considered for the same reasons. A preliminary evaluation of technologies associated with the remaining three response actions are presented in Table 3-1.

Based on the preliminary evaluation, a form of soil gas extraction, with or without accompanying injection or enhanced removal, is the preferred alternative for collection of the carbon tetrachloride vapor. The treatment process for the vapor once aboveground is likely a carbon absorption system or a form of thermal treatment. These alternatives will be further evaluated as part of the IRA Proposal (engineering evaluation/cost assessment).

Table 3-1. Potential Viable Technologies for Remediation of Contaminated Soil (Page 1 of 2)

Remedial Technology	Process Description	Comments	Retain for Further Evaluation[a]
A. CONTAINMENT			
a. Ground Freezing:	Coolant is circulated in loops in the ground to temporarily freeze the soil and make it less permeable.	Not cost effective for great thicknesses of contaminated soil. Not a well-tested technology.	No
b. Stabilization/ Solidification:	Processes reduce the movement by physical entrapment.	Limited effectives for the depth and thickness of the contaminated vadose. Reliability is uncertain.	No
B. COLLECTION			
a. Excavation and Removal:	Removal of contaminated soil by common construction equipment.	Prohibitive depth of contaminated soils. Large volumes for disposal.	No
Extraction			
Extraction Wells:	Removal of soil gas by vacuum pumping.	Extraction wells feasible. May require soil gas treatment. Could use existing vertical or new vertical wells. Horizontal wells may not be feasible due to nature and depth of the vadose sediments.	Yes
Injection Wells:	Inject air (or other gas) to flush contaminated soils (used with extraction wells or collection system).	Injection wells feasible. Injection could flush contaminants into the groundwater. Could use existing or new wells.	Yes

Table 3-1. Potential Viable Technologies for Remediation of Contaminated Soil (Page 2 of 2)

Remedial Technology	Process Description	Comments	Retain for Further Evaluation[a]
Enhanced Removal:	Injection of chemicals into the aquifer to aid in contaminant removal from the aquifer.	Not applicable to large volumes of soils with complex waste mixtures. Increasing mobility of contaminants could increase migration.	No
6. TREATMENT			
a. No Treatment	Carbon Tetrachloride gases are vented directly to the air.	Feasible, dependent upon regulatory requirements.	Yes
b. Biological Treatment: (Including in situ treatment)	Microorganisms metabolize hazardous organic compounds rendering them nonhazardous.	Not feasible for the short timeframe of an IRA.	No
c. Physical Treatment -			
Carbon Absorption:	Organic compounds are absorbed and retained on the carbon media.	Reliable and applicable for carbon tetrachloride vapor.	Yes
d. Thermal Treatment:	Heat is applied to thermally destroy hazardous organic compounds.	Reliable and applicable for carbon tetrachloride vapor.	Yes

[a]Remedial technologies not retained willbe given further consideration during the IRA engineering evaluation/cost assessment (see Chapter 5.0).

4.0 PHASE I SITE EVALUATION

4.1 DATA COMPILATION AND REVIEW TASKS

The site evaluation is focused on determining vadose zone physical and chemical properties because the IRA will focus on remediation of the carbon tetrachloride vapor in the vadose zone (Chapter 3.0). In addition, the preliminary assessment of potential remediation technologies suggests a form of soil vapor extraction will be used. Therefore, site evaluation is also focused on providing design input for this process.

The principal purposes of site evaluation are to verify and refine the conceptual model of contaminant identity and distribution and to investigate and quantify the physical characteristics of the vadose zone. Site evaluation will be conducted in a phased approach and in parallel with the preparation of the engineering evaluation/cost assessment. Phase I of the site evaluation will include compiling and reviewing existing data, sampling and analysis of soil gas and groundwater, testing vacuum extraction equipment, and numerical modeling. Initial data needs include:

- assessment of the suitability of existing structures (i.e., wells, vents, piping) for use in characterization and remediation
- lateral and vertical distribution of carbon tetrachloride in the vadose zone
- lateral and vertical distribution of carbon tetrachloride in the groundwater
- large scale hydraulic properties of the unsaturated zone
- assessment of the efficiency of vacuum extraction equipment at the principal carbon tetrachloride disposal sites.

The emphasis of the Phase I investigations is on cost efficiency, timeliness, and safety. For example, the Phase I investigations will use only existing structures (boreholes, piping, vents) to reduce costs, durations, and safety hazards associated with drilling and sampling in the radioactive soils beneath the three principal disposal sites. The analyses of soil gas and groundwater will be performed at EPA analytical Level II in the field using portable equipment to reduce costs and turnaround times.

A Phase II site evaluation will be conducted as required by the results of the Phase I site evaluation and remedial action. Additional tasks might include drilling and sampling one or more new wells (outside the zone of radioactively contaminated soils). The new wells would be placed to optimize vapor extraction.

4.1.1 Task 1 - Source Data Compilation and Review Task

This task will consist of compiling and evaluating existing information on carbon tetrachloride (and other) waste generation, storage, handling, and

disposal. Information sources would include topographic maps, aerial photographs, engineering plans and drawings, Z Plant inventory and activity records, effluent discharge reports, and environmental release reports. This task will also include interviews with those having personal knowledge of past activities at the 200 West Area. Data evaluation will focus on exact locations and construction specifications of pertinent disposal facilities, their periods of operation and functional uses, and types and quantities of radiological or hazardous materials generated, used, and/or discharged.

4.1.2 Task 2 - Geologic/Geochemical Data Compilation and Review

This task will consist of compiling and evaluating existing data on regional (200 West Area) and site-specific geology and on soil contamination in the vicinity of the principal carbon tetrachloride disposal sites. This task will focus on collection of existing geologic literature, maps, borehole geologic and geophysical logs, surface radiation survey results, and soil contaminant distribution.

4.1.3 Task 3 - Hydrogeologic Data Compilation and Review

This task will consist of compiling and evaluating existing data on regional (200 West Area) and site-specific hydrogeology and on groundwater contamination. Information sources will include hydrogeologic and groundwater monitoring reports, existing monitoring well construction records, and groundwater quality data.

4.2 FIELD INVESTIGATION TASKS

4.2.1 Task 1 - Evaluation of Existing Wells

Task Objective: The purpose of this activity is to obtain information on the integrity and accessibility of, and depth of groundwater existing in boreholes located in the vicinity of the three carbon tetrachloride disposal sites for use during characterization activities (i.e., soil gas and groundwater sampling) and/or remedial actions (i.e., soil vacuum extraction).

Task Description: After the existing information on boreholes is collected and analyzed (as part of Section 4.1.1), wells will be visually inspected and sounded to determine the total depth and water level (if groundwater present). A television camera will be run on wells specified by the project scientist or project engineer.

Sampling Locations, Frequencies, and Analyses: No sampling is required under this task. Wells within approximately 100 ft of each of the three waste sites will be included in the evaluation. Other wells of interest will be included at the discretion of the project scientist or project engineer. All well locations not currently identified with Hanford Site coordinates and elevations will be surveyed (Task 3).

4.2.2 Task 2 - Topographic Mapping

Task Objective: The objective of this task is to provide a base map that will be used to locate activities for characterization tasks. This task will be deleted at the discretion of the project scientist if sufficient existing data are found during data compilation (Section 4.1.1).

Task Description: Topographic maps for the three disposal sites will be mapped at a scale that will allow the precision needed to show elevation contours at 0.5-m intervals. Site features such as fencelines; gates, buildings, pipelines, and roads will be included. The site maps will extend 200 ft beyond the disposal sites.

Sampling Locations, Frequencies, and Analyses: No sampling is required under this task.

4.2.3 Task 3 - Locational Data Documentation

Task Objective: The objective of this activity is to document all Phase I field sampling locations.

Task Description: Locational data includes Hanford Site coordinates, elevations in feet (ft) above mean sea level, and depths of boreholes/probes below the surface. Table 1 identifies the locational data needed for specific sampling methods.

Table 1. Locational Data Types for Sampling Methods

Sampling Method	Locational Data Type
Soil Gas Probes	NS/EW Coordinates, Elevations, Depths
Existing Wells	NS/EW Coordinates, Elevations, Depths
Geophysical Transects	NS/EW Coordinates

Sample Locations, Frequencies, and Analyses: No sampling is required under this task.

4.2.4 Task 4 - Geophysical Survey

Task Objective: The objective of this activity is to determine the boundaries, depths of fill, and locations of buried objects at the three disposal sites. This task will be deleted at the discretion of the project scientist if sufficient existing data are found during data compilation (Section 4.1.1).

Task Description: The need for the implementation of this activity is contingent on the results of the source data compilation described in Section 4.1.1. If available information is insufficient, additional data will be acquired using ground-penetrating radar and/or electromagnetic induction.

Sampling Locations, Frequencies, and Analyses: At each disposal site, a grid sampling pattern will be established at a scale that will allow delineation of crib boundaries at the surface with a 3-ft resolution; fill depths and buried objects will be delineated within the upper 12 ft with a resolution of 1 ft. Two orthogonal lines across each crib will be surveyed for buried objects before the surface soil gas surveys are conducted (Task 5).

4.2.5 Task 5 - Soil Gas Surveys

4.2.5.1 Task 5A Surface Soil Gas Survey

Task Objective: The purpose of this activity is to map and verify the contaminant distribution of carbon tetrachloride in the vicinity of the three disposal sites.

Task Description: A soil gas survey will be conducted to determine the lateral distribution of carbon tetrachloride vapor and/or other soil gases beneath the three disposal sites.

Sample Locations, Frequencies, and Analyses: The surface soil gas survey at each of the three disposal sites will be conducted initially along two orthogonal grid lines which extend 100 ft in each direction beyond the crib boundaries. At each disposal site, approximately 30 to 50 soil gas probes will be installed at 20-ft intervals, where feasible. The sample spacing may be reduced by the field team leader or project scientist to define any contaminant gradients. Additional soil gas sampling may be conducted at the discretion of the project scientist. Soil gas concentrations will be analyzed using a portable gas chromatograph. Soil gas probe locations will be staked for surveying (see Task 3). Samples will be analyzed for volatile hydrocarbons. If feasible, installation will be permanent to allow resampling during later phases of the remediation.

4.2.5.2 Task 5B Soil Gas Surveys in Existing Wells

Task Objective: The purpose of this task initially is to determine if carbon tetrachloride and/or other gases are present in existing wells or structures (i.e., vents, crib piping) at the three disposal sites and then, if feasible, to determine the vertical distribution of the carbon tetrachloride and/or other gases. The data will also be used to estimate large scale hydraulic properties required in the modeling effort.

Task Description: During the first phase, samples of the undisturbed gases will be collected from the bottom of boreholes near each disposal site. This activity will be conducted in conjunction with Task 1. The samples will preferably be collected during falling (or rising) barometric pressure. Samples will be collected using explosion-proof solenoid valve collection devices and analyzed with a portable gas chromatograph.

The second phase of this task will consist of sampling an existing well(s) (as chosen by the project scientist and project engineer) at one of the three disposal sites using a vacuum pump. This test will be conducted in conjunction with Task 7 when appropriate. Sampling will be conducted using straddle packers to isolate screened sections of a well. Further testing may

be conducted (at the direction of the project scientist or project engineer) by perforating the well casing to expose additional intervals. Before perforating the casing in wells within or near the three disposal sites, a spectral gamma logging tool will be run down the well to identify zones of radioactively contaminated soils. Casing in radioactively contaminated zones will not be perforated, unless specified by the project scientist or project engineer. If feasible, installations will be permanent to allow observations during nearby tests and resampling during a later phase of the remediation.

A pressure transducer will be placed in the borehole at the open interval to record the downhole pressure at 10-s intervals. The flow meter on the vacuum pump will also provide data at 10-s intervals. If feasible, data will be collected at several different flow rates (Task 7). Pressure transducers will be placed at several isolated intervals in a nearby observation well(s); a barometric pressure recorder will be placed at or near the surface of the observation well(s). This information will be used to estimate the large scale hydraulic conductivities of the unsaturated sediments for soil gas (Sisson and Ellis 1990).

Sampling Locations, Frequencies, and Analyses: During the first phase, all wells which are to be evaluated during Task 1 will also be sampled unless otherwise directed by project scientist or field team leader. Each well will be sampled once. Crib structures will be sampled at the discretion of the project scientist or field team leader.

During the second phase of this task, the wells and/or structures to be sampled will be chosen by the project scientist and project engineer based on the results of the undisturbed sample results (first phase), the well evaluation study (Task 1), and the vacuum pump requirements (Task 7). Multiple samples will be collected during the vacuum pump test.

Soil gas will be analyzed for volatile aromatic and halogenated hydrocarbons using a portable gas chromatograph.

4.2.6 Task 6 - Groundwater Sampling

Task Objective: The purpose of this activity is to sample and analyze existing monitoring wells in and around the three disposal sites and at other locations pertinent to the IRA. Data will be used to assess the distribution of the carbon tetrachloride in groundwater and to identify wells which can be used to monitor the success of the IRA.

Task Description: Groundwater samples will be obtained from existing wells. If necessary, sampling pumps will be installed. The data will be integrated with results from the ongoing Hanford Site groundwater monitoring programs.

Sample Locations, Frequencies, and Analyses: Groundwater samples will be collected from approximately 16 wells. The initial list (Table 2) was chosen based on well location, well construction, screened intervals, and carbon tetrachloride concentration history. Wells may be added or subtracted from the initial sampling network at the discretion of the project scientist

or field team leader. Sampling during this phase will occur at least once. The samples will be analyzed with portable field screening equipment (gas chromatograph). Sampling and analysis of groundwater during and after remediation will be conducted under the monitoring program set forth in the Operations and Maintenance Plan (see Chapter 6.0).

Table 2 Groundwater Wells to be Sampled

Well	Purpose/Location
299-W18-7*	216-Z-1A Tile Field
299-W18-9	216-Z-18 Crib
299-W18-10	216-Z-18 Crib
299-W18-11	216-Z-18 Crib
299-W18-12	216-Z-18 Crib
299-W15-6	216-Z-9 Trench
299-W15-8	216-Z-9 Trench
299-W15-9	216-Z-9 Trench
299-W15-16	Maximum observed concentrations
699-39-79	Increasing concentrations near maximum of plume
699-38-70	Eastern perimeter of plume
699-49-79	Northern perimeter of plume
699-43-88	Western perimeter of plume
299-W18-20	Southern perimeter of plume
299-W18-17	Southern perimeter of plume
299-W18-18	Southern perimeter of plume

*Note: Well 299-W18-6 at the 216-Z-1A Tile Field is believed to be collapsed and dry.

4.2.7 Task 7 - Vacuum Extraction Test

Task Objective: The purpose of this activity is to obtain information on: (1) the volume and types of contaminants that can be extracted from existing wells; (2) information on trends in concentration of contaminants extracted over time; and (3) information on the zone of influence using the existing wells for gas extraction. This activity will be conducted to provide information that may be useful in design and evaluation of remedial technologies.

Task Description: At one of the three principal carbon tetrachloride disposal sites (to be determined by the project scientist and project engineer), one well will be used as a gas extraction well while another well(s) will be used as an observation well(s). The extraction well shall be pumped for a period of approximately 1 wk (or longer at the discretion of the project scientist or project engineer) to characterize the volume and nature of contaminants that can be extracted.

Air pressure in the observation well shall be monitored during pumping to determine whether it is within the zone of influence of the extraction well. If the observation well is within the zone of influence, at the option of the project scientist or project engineer, a tracer gas will be injected

into it to determine the travel time and source strength required to detect it in the extraction well.

A calibrated flowmeter shall continuously monitor the volume of vapor removed from the well and a vacuum gauge will monitor and control the vacuum applied to the well to maintain it at a steady pressure.

A test plan will be prepared prior to the conduct of this test.

Sampling Locations, Frequencies, and Analyses: The identity of pumping and monitoring well(s) will be determined after the well evaluation task (see Task 1). During the first week of pumping, soil gas samples shall be collected from the extraction air stream at the following frequencies:

- Hourly for the first 4 hr of pumping
- Every 4 hr for the next 20 hr of pumping
- Every 6 hr for the next 24 hr of pumping
- Every 12 hr for the next 5 d.

Sampling shall be conducted at the frequencies noted above, unless results of that sampling indicate modifications to the schedule are warranted.

Samples will be analyzed onsite for volatile aromatic and halogenated hydrocarbons using a portable gas chromatograph equipped with an electron capture detector and a photoionization detector. Further details will be found in the test plan.

4.3 DATA EVALUATION

4.3.1 Task 1 - Data Integration

The results from the Phase I Site Evaluation will be compiled and integrated with existing data (Section 4.1.1). Data and interpretations will be displayed in cross sections and/or maps that illustrate contaminant distribution, site physical characteristics, geology, and hydrogeology.

4.3.1 Task 2 - Modeling

Task Objective: A modeling process will be employed to provide estimates of the extent of contamination and of concentration of carbon tetrachloride vapors and to guide the remediation activities. The modeling process includes the use of field sampling results.

Task Description: Information collected in Section 4.1, "Data Compilation and Review Tasks", Task 1, "Source Data Compilation and Review Task" will form the basis of definition of the source term, which is basic to the modeling process.

The other fundamental aspect of the modeling process is the development of a conceptual model of the subsurface environment, and this will be based on Task 2, "Geologic/Geochemical Data Compilation and Review" of Section 4.1.

The modeling process will be accomplished by dealing with the source term in several steps to ascertain the importance of the several phases of the carbon tetrachloride and how each interacts with the subsurface environment. Much of the modeling activity will be based on work performed at the Idaho National Engineering Laboratory by EG&G (Sisson and Ellis 1990).

The primary model for use in this project is PORFLO, which has been applied on several Hanford Site projects. This code deals with two-dimensional flow and transport (and has the option of three-dimensional flow and transport, if necessary) in the vadose zone and groundwater. It also has the capability of dealing with heat flow and, with some modification, two-phase flow, if these conditions are appropriate and feasible in the limited time available.

Data collected under the field activities of Section 4.2 will be used to assist in model calibration and refinement of the conceptual model.

Sampling Locations, Frequencies, and Analyses: No sampling is required under this task.

DRAFT

5.0 IRA PROPOSAL AND ACTION MEMORANDUM

The purpose of the IRA proposal is to provide the EPA, Ecology, and the public with information that (1) defines the origin, nature, and extent of contamination at the site; (2) characterizes the hydrogeologic regime; (3) assesses public health and environmental risk; (4) evaluates viable remedial technologies; and (5) recommends remedial actions. This report will be completed following the completion of the site evaluation tasks (see Chapter 4.0).

If an IRA is warranted, an evaluation of remedial technologies must be conducted. This step involves a rapid, focused engineering evaluation/cost assessment, using specific screening factors and selection criteria to assess the feasibility, appropriateness, and costs of available technologies. The IRA proposal, which contains the engineering evaluation/cost assessment, will undergo a concurrent DOE, EPA, and Ecology review. In addition, the public will have a 30-day period to comment on the document.

Upon reviewing the IRA proposal, the EPA will issue an IRA action memorandum. The action memorandum serves as the primary decision document substantiating the need for a removal response and documents EPA's selection of the remedial action.

DRAFT

6.0 IRA DESIGN AND IMPLEMENTATION

Following the decision of the EPA to conduct a specific remedial action at the carbon tetrachloride disposal sites through the action memorandum (see Chapter 5.0), the remedial action will be designed and implemented. Details of the design and implementation strategy will be documented in design plans before the implementation of the remedial action. Many of the initial design input parameters will be collected during site evaluation (see Chapter 4.0). In addition, an operation and maintenance plan will be prepared prior to initiating the remedial action.

If a soil vapor extraction system is used in the remedial action, as suggested by EPA and Ecology guidance (see Exhibit 1), a phased strategy of implementation will be used:

- Phase I - Initiate organic vapor extraction (and treatment) using existing wells as air injection and/or vapor withdrawal wells at one or two of the principal carbon tetrachloride disposal sites. Certain wells may require structural modification.

- Phase II - Deepen wells and/or install new wells to increase the organic removal efficiency of the vapor extraction system. Expand the remedial action to include the remaining principal carbon tetrachloride disposal site(s) or other candidate sites identified during site evaluation.

A Phase II implementation, under this scenario, would not be initiated without concurrence by the EPA and Ecology. Results from a Phase I remedial action (i.e., recovery efficiency and other process design data) will be used as design input in subsequent design processes for Phase II remedial action.

DRAFT

7.0 PROJECT SCHEDULE

The anticipated schedule for completing the 200 West Area Carbon Tetrachloride IRA is presented in Figure 7-1. The following key assumptions were used in the development of this schedule:

- The schedule is for the Phase I site evaluation and remediation.
- Site evaluation tasks will primarily consist of nonintrusive investigative activities (no drilling).
- Existing well conditions will not prohibit use of certain wells (or a sufficient number thereof) in the remedial action.
- The schedule will not be impacted by the conduct of a safety analysis (DOE Order 5481.18)
- The IRA Proposal is concurrently reviewed by DOE, EPA, and Ecology; the public will have a 30-day period to comment on the IRA proposal.
- A form of soil vapor extraction with some form of aboveground treatment will be used for the remedial action.
- The remediation facilities can be constructed and brought on-line from "off-the-shelf" components.
- Facilities will not be subject to NQA-1 nuclear design requirements.

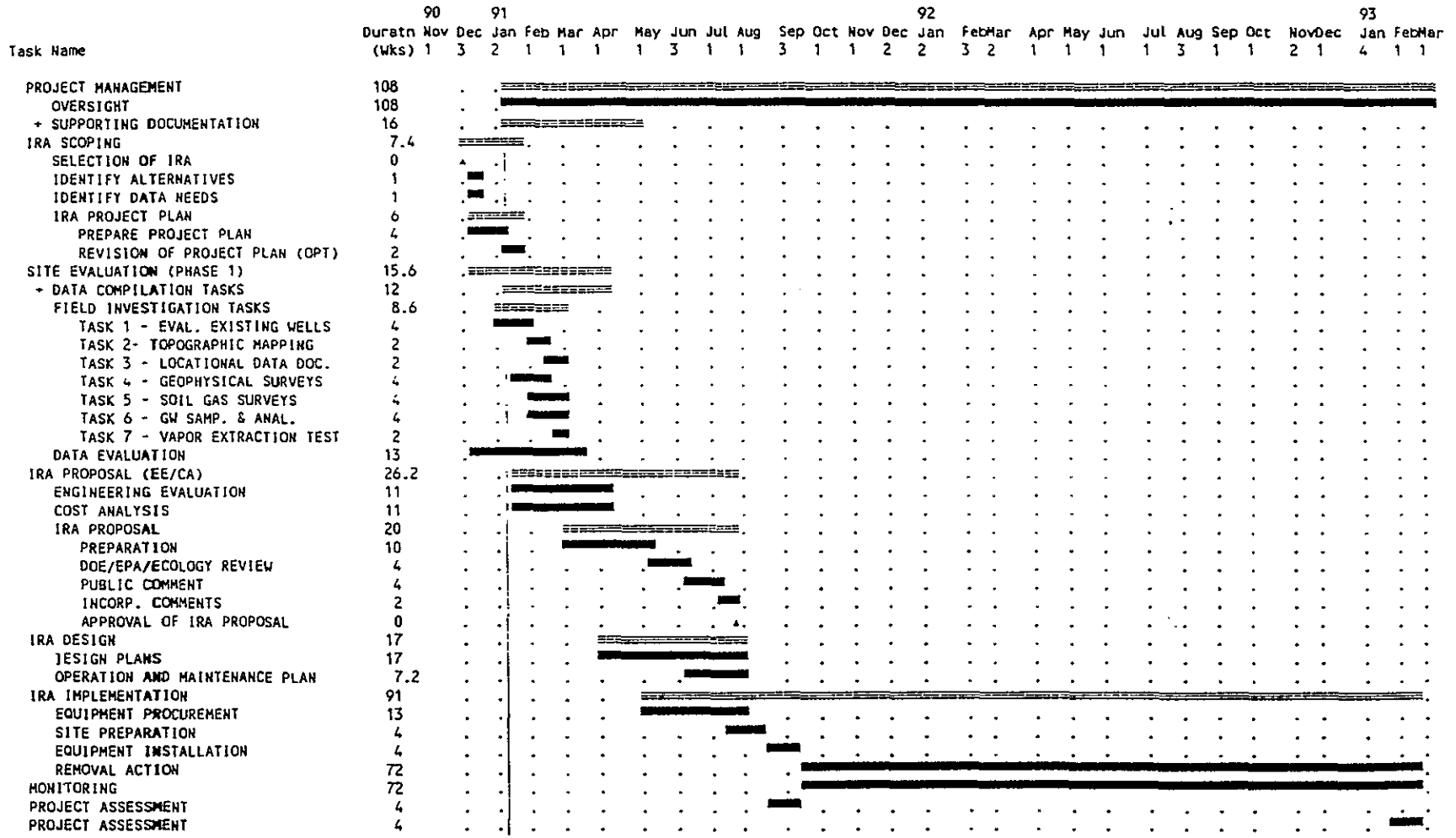


Figure 7-1. Phase I 200 West Area Carbon Tetrachloride IRA.

8.0 REFERENCES

Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

Evans, J. C., R. W. Bryce, D. J. Bates, and M. L. Kemner, 1990, *Hanford Site Ground-Water Surveillance for 1989*, PNL-7396, Pacific Northwest Laboratory, Richland Washington.

Graham, M. J., M. D. Hall, S. R. Strait, and W. R. Brown, 1981, *Hydrology of the Separations Area*, RHO-ST-42, Rockwell Hanford Operations, Richland, Washington.

Kasper, R. B., 1982, *216-Z-12 Transuranic Crib Characterization: Operational History and Distribution of Plutonium and Americium*, RHO-ST-44, Rockwell Hanford Operations, Richland, Washington.

Last, G. V., B. N. Bjornstad, and others, 1989, *Hydrogeology of the 200 Areas Low-Level Burial Grounds - An Interim Report*, PNL-6820, Pacific Northwest Laboratory, Richland, Washington.

Owens, K. W., 1981, *Existing Data on the 216-Z Liquid Waste Sites*, RHO-LD-114, Rockwell Hanford Operations, Richland, Washington.

Price, S. M., R. B. Kasper, M. K. Additon, R. M. Smith, and G. V. Last, 1979, *Distribution of Plutonium and Americium beneath the 216-Z-1A Crib: A Status Report*, RHO-ST-17, Rockwell Hanford Operations, Richland, Washington.

Sisson, J. B., and G. C. Ellis, 1990, *Summary Report of Results of the Vapor Vacuum Extraction Test at the RWMC*, EGG-WM-9301, Idaho National Engineering Laboratory, EG&G Idaho, Inc., Idaho Falls, Idaho.

Sloat, R. J., 1967, *Hanford Low Level Waste Management Reevaluation Study*, ARH-231.

WHC 1990, *WIDS Database Field Descriptions and Data*, WHC-MR-0056, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

SAMPLING AND ANALYSIS PLAN

PART 1 - FIELD SAMPLING PLAN (see Chapter 4.0)

PART 2 - QUALITY ASSURANCE PROJECT PLAN (Phase I Site Evaluation)

DRAFT

DRAFT

QUALITY ASSURANCE PROJECT PLAN
Phase I Site Evaluation

PROJECT DESCRIPTION

The primary objective of the 200 West Area Carbon Tetrachloride Interim Response Action (IRA) is to remediate carbon tetrachloride vapors in the unsaturated sediments in the 200 West Area. The focus of the Phase I Site Evaluation effort will be on the three liquid waste disposal sites associated with Z Plant which received the bulk of the carbon tetrachloride in the 200 West Area: (1) the 216-Z-1A Tile Field, (2) the 216-Z-9 Trench, and (3) the 216-Z-18 Crib. The descriptions of the physical characteristics of the IRA site, nature, and extent of contamination are included in Section 2.0, Site Characteristics. Specific project objectives for the field investigation tasks of the Phase I Site Evaluation are outlined in Section 4.2.1.

PROJECT ORGANIZATION AND RESPONSIBILITIES

Key personnel and organizations necessary for IRA activities are outlined in the Attachment 3, Project Management Plan (PMP). The PMP includes a chart indicating organization and line of authority.

QUALITY ASSURANCE (QA) OBJECTIVES FOR MEASUREMENT

Samples will be analyzed at Environmental Protection Agency Level II with a portable gas chromatograph. Field screening with a calibrated instrument is adequate for determining concentrations, and the results are required in real-time. Accuracy, precision, and detection limits of the instrument will be determined during field calibration.

PROCEDURES

The Westinghouse Hanford Company (Westinghouse Hanford) procedures that will be used to support the sampling plan have been selected from the Environmental Engineering, Technology and Permitting function's *Quality Assurance Program Plan* (WHC 1990), which will be included in the Westinghouse Hanford QA program plan for *Comprehensive Environmental Response, Compensation, and Liability Act* Remedial Investigation/Feasibility Study activities. Selected procedures include Environmental Investigations Instructions (EIIs) from the *Environmental Investigations and Site Characterization Manual* (WHC 1989b), and Quality Requirements and Quality Instructions, from the *Westinghouse Hanford Quality Assurance Manual* (WHC 1988a)

The tasks of the Phase I Site Evaluation are discussed in Section 4.2, Field Investigation Tasks, and are listed in Table 1 for easy reference. The EII *Environmental Investigations and Site Characterization Manual* (WHC 1989) which govern these tasks are listed in Table 2. Details on the surveying

equipment and procedures (Tasks 2 and 3) will be specified in approved participant contractor procedures; EII 12.1, Surveying. Procedures for Soil Gas Analysis (Task 5) and Groundwater Analysis (Task 6) using a portable GC are in preparation. Procedures governing the Vacuum Extraction Test (Task 7) are in preparation.

Table 1. Field Investigation Tasks.

Number	Title
Task 1	Evaluation of Existing Wells
Task 2	Topographic Mapping
Task 3	Locational Data Documentation
Task 4	Geophysical Survey
Task 5	Soil Gas Surveys
Task 6	Groundwater Sampling
Task 7	Vacuum Extraction Test

Table 2. Procedures for Field Investigation Tasks.

		Task						
	Procedure	1	2	3	4	5	6	7
EII 1.5	Field Logbooks	X	X	X	X	X	X	X
EII 5.8	Groundwater Sampling						X	
EII 5.9	Soil-Gas Sampling			X		X		
EII 6.6	Well Characterization		X	X				
EII 11.2	Geophysical Survey Work				X	X		

Procedural approval, revision, and distribution control requirements applicable to EIIs are addressed in EII 1.2, Preparation and Revision of Environmental Investigations Instructions. Deviations from established EIIs that may be required in response to unforseen field situations may be authorized in compliance with EII 1.4, Deviation from Environmental Investigations Instructions.

Sampling locations, frequencies, and analyses are described in Section 4.2.

SAMPLE CUSTODY

Sample custody will be maintained as appropriate if sample analysis does not immediately follow sample collection. Results of analyses shall be traceable to original samples through the unique code or identifier assigned to the sample in the field. Results of field investigations will be controlled according to Attachment 4, Data Management Plan.

CALIBRATION PROCEDURES

Calibration of measuring equipment will be done according to procedures governing its use. Calibration of Westinghouse Hanford, participant contractor, or subcontractor analytical equipment shall be as defined by applicable standard analytical methods, subject to Westinghouse Hanford review and approval.

ANALYTICAL PROCEDURES

Analytical methods are identified in Section 4.2, Field Investigation Tasks. Procedures based on these methods will be selected or developed and approved prior to use in compliance with appropriate Westinghouse Hanford procedure and/or procurement control requirements.

DATA REDUCTION, VALIDATION, AND REPORTING

The Field Team Leader for each task will be responsible for preparing a report summarizing the results of analysis and for preparing a detailed data package that includes all information necessary to perform data validation as required. As a minimum, data packages will include:

- Sample documentation, including identification of the organizations and individuals performing the extraction and analysis; the signatures of the responsible extractor and analyst; documentation of any sample custody; and the dates of sample extraction and analysis.
- Instrument calibration documentation, including equipment type and model, for the time period in which the sample analysis was performed.
- Quality control data, as appropriate for the methods used.
- Analytical results or data deliverables, including reduced data, reduction formulae or algorithms, and identification of data outliers or deficiencies.

INTERNAL QUALITY CONTROL

Internal quality control methods, such as the use of field duplicate samples and field blanks, will be used as appropriate.

PERFORMANCE AND SYSTEMS AUDITS

Audits in environmental investigations are considered to be systematic checks that verify the quality of operation of one or more elements of the total measurement system. Performance audit requirements will be met by the use of internal quality control methods, as appropriate. Systems audits will be scheduled if so requested by the project lead, project scientist, or U.S. Department of Energy-Richland Operations Office (DOE-RL).

PREVENTIVE MAINTENANCE

All measurement and testing equipment used in the field that directly affects the quality of the analytical data shall be subject to preventive maintenance measurements that ensure minimization of measurement system downtime. Field equipment maintenance instructions shall be as defined by the approved procedures governing their use.

DATA ASSESSMENT PROCEDURES

Measurement data will be assessed for qualities such as precision and accuracy by the Field Team Leader responsible for that measurement.

CORRECTIVE ACTIONS

In the context of quality assurance (QA), corrective actions are procedures that might be implemented on samples that do not meet QA specifications. A corrective action request might be generated, for example, by an audit. Corrective actions may include resampling or reanalyzing samples, if feasible. The primary responsibility for corrective action resolution is assigned to the project scientist and project lead.

QUALITY ASSURANCE REPORT

Copies of all QA documentation, such as audits and corrective action resolutions, will be routed to the project QA records upon completion of the sampling and analysis activities. The final project report will summarize the data quality information related to the field investigation activities.

DRAFT

ATTACHMENT 2

HEALTH AND SAFETY PLAN

The work plan level Health and Safety Plan (HSP) addresses potential health and safety issues associated with characterization and remediation during the 200 West Area Carbon Tetrachloride Interim Remedial Action (IRA) project. The HSP consists of the site description and discussion of the types/sources of contamination based on all available information. Site/task-specific hazards, per 29 CFR 1910.120 and environmental investigation instructions (EII) 2.1 (WHC 1988), will be detailed in site/task-specific Preparation of Hazardous Waste Operations Permits.

SITE DESCRIPTION

The 200 West Area IRA focuses on three retired liquid waste disposal facilities associated with Z Plant plutonium recovery processes: (1) the 216-Z-1A Tile Field, (2) the 216-Z-9 Trench, and (3) the 216-Z-18 Crib. The IRA activities include use of existing structures (e.g., boreholes, vents, and piping) located within these facilities. These three cribs received the bulk of the carbon tetrachloride disposed to the ground between 1955 and 1973, when soil column disposal of carbon tetrachloride associated with Z Plant processes ceased. Locations and descriptions of the cribs are included in Section 2.1.1, Liquid Waste Disposal Facilities.

TYPES/SOURCES OF CONTAMINATION

The three principal carbon tetrachloride disposal sites received acidic and organic, actinide-bearing liquid wastes (Section 2.2.1). Based on existing information, the contaminants discharged to the cribs are both chemical and radiological.

Aqueous solutions discharged to the three principal carbon tetrachloride cribs were concentrated, acidic, metal nitrate salt wastes (Section 2.2.1). Organic material, including carbon tetrachloride, tributyl phosphate, and dibutylbutylphosphonate, and fabrication oil, were disposed in saturation amounts in the aqueous solution and also separately in batches. Carbon tetrachloride degradation products such as chloroform and methylene chloride are also likely. An 0.07 M solution of cadmium nitrate (a total of 11 kg of cadmium) was later sprayed on the soil at 216-Z-9 Trench.

The principal radiological contaminants in the vadose zone underlying the three cribs are plutonium-239/240 and americium-240. Minor amounts of cesium-137 and strontium-90 are also indicated in the Waste Information Data System database for the 216-Z-9 Trench and 216-Z-1A Tile Field. Routine surface radiation surveillances are conducted at these cribs, and no problems have been identified. The radiological hazards associated with IRA activities will be controlled by radiation work permits.

Groundwater contaminants identified in the 200 West Area include carbon tetrachloride, chloroform, cyanide, fluoride, hexavalent chromium, trichloroethylene, nitrate, strontium-90, tritium, technetium-99, iodine-129, and uranium (Section 2.2.2).

REFERENCES

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7; Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *WIDS Database Field Descriptions and Data*, WHC-MR-0056, Westinghouse Hanford Company, Richland, Washington.

DRAFT

ATTACHMENT 3

PROJECT MANAGEMENT PLAN

The purpose of the project management plan (PMP) is to define the administrative and institutional tasks necessary to support the 200 West Area Carbon Tetrachloride Interim Response Action (IRA) within the 200-ZP-1 and 200-ZP-2 operable units. The PMP defines the responsibilities of the various participants, organizational structure, project tracking, and reporting.

PROJECT ORGANIZATION AND RESPONSIBILITIES

INTERFACES

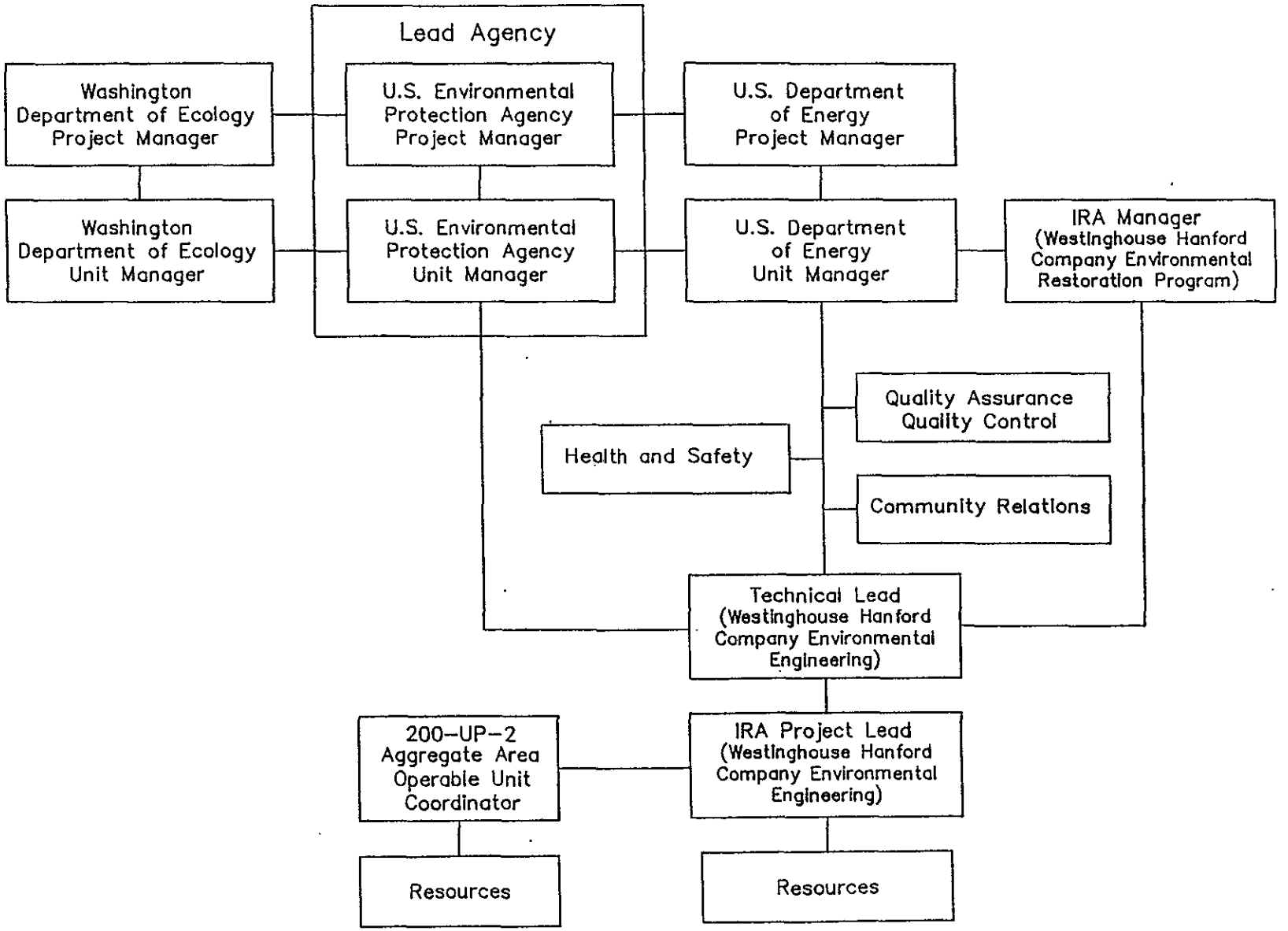
Figure 1 shows the U.S. Environmental Protection Agency (EPA), Washington Department of Ecology (Ecology), U.S. Department of Energy (DOE), and Westinghouse Hanford Company (Westinghouse Hanford) organizational interfaces for the IRA. The IRA is conducted under the lead of the EPA per the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 1989). The specific responsibilities of EPA, Ecology, and the DOE are detailed in the Action Plan (Attachment 2 of the Tri-Party Agreement). Westinghouse Hanford Environmental Engineering is the technical lead for the 200 Area operable units and any remedial actions. The IRA is to be conducted on inactive disposal sites located within the 200-ZP-1 and 200-ZP-2 operable units. Remedial investigations have not yet been initiated within these operable units; however, an aggregate study of the 200 West Area has been proposed to be conducted concurrently with the IRA. A Westinghouse Hanford technical coordinator has been assigned to this project and will interface with the IRA technical lead.

PRINCIPAL ORGANIZATIONS

The IRA will be conducted under the lead of the Westinghouse Hanford Environmental Division. Three groups within the Environmental Division will provide project management to accomplish the major elements of the IRA (Figure 2), they are as follows:

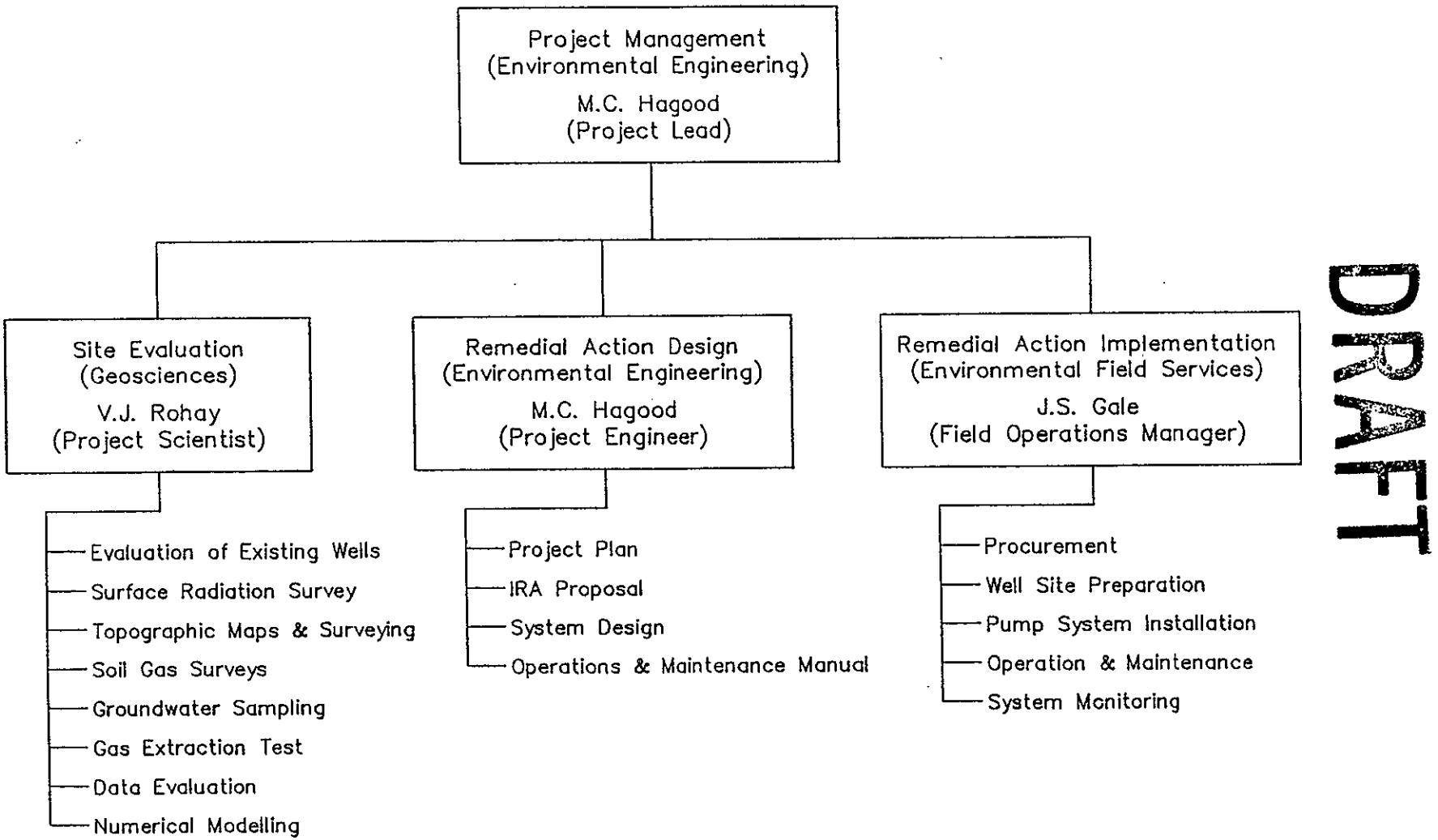
Environmental Engineering Group (EEG)--The EEG provides a project management lead and coordinates technical resources for the IRA. The EEG also provides a project engineering lead to conduct the IRA design. In addition, the EEG supports the IRA site evaluation activities by conducting certain field and data evaluation tasks (i.e., soil gas surveys).

Geosciences Group (GG)--The GG provides a project scientist to conduct the IRA site evaluation tasks. The project scientist also provides support to the project lead, project engineer, and operations manager during the IRA design and implementation.



MCH\010390-B

200-West Carbon Tetrachloride IRA Organization



DRAFT

MCH\123090-D

DRAFT

Environmental Field Services (EFS)--The EFS provides a field operations manager to implement the IRA. The EFS also provides field support and technical review support to conduct IRA site characterization and design tasks. In addition, EFS prepares and provides approved industrial health and safety documents and a site safety officer to oversee health monitoring activities.

OTHER SUPPORT ORGANIZATIONS

Other organizations within and outside the Environmental Division provide support to the IRA project. The organizations and services are described below.

- National Environmental Policy Act (NEPA) Documentation--Ensures the necessary documentation for NEPA and State Environmental Policy Act for the IRA are approved and in place.
- Regulatory Analysis--Provides information and regulatory guidance on environmental regulations (i.e., air permitting).
- Industrial Safety and Fire Protection (IS&FP)--Ensures applicable health and safety requirements are appropriately addressed and provides a letter report summarizing IS&FP activities during IRA activities.
- Quality Assurance--Ensures appropriate quality assurance requirements are addressed and conducts surveillance of the IRA as necessary.
- Environmental Protection--Ensures compliance with environmental regulations and Hanford Site requirements.
- Health Physics--Prepares and issues the necessary Radiation Work Permit and provides necessary Health Physics technician support during removal and related activities.
- Cultural Resources (Pacific Northwest Laboratory)--Provides archaeological documentation and support as necessary.
- Facility Safety--Prepares and issues required facility safety documents(s).
- Inactive Facilities Surveillance and Maintenance--Provides nuclear process operators and decontamination and decommissioning workers as needed to support IRA activities.

DRAFT

DOCUMENTATION AND RECORDS

An IRA proposal will be prepared by Westinghouse Hanford as a primary document and reviewed by the U.S. Department of Energy-Richland Operations Office (DOE-RL), EPA, Ecology, and the public. The comments received will be resolved prior to the EPA issuing an action memorandum which officially documents their approval of the proposed activities.

All other records and reports related to the IRA will be considered secondary documents and will be included in the project records to be maintained by the project lead in accordance with environmental investigations instruction (EII) 1.6, Records Management (WHC 1988). Appropriate records will also be incorporated into an official administrative record file, which will be made available for public review.

FINANCIAL AND PROJECT TRACKING REQUIREMENTS

The Westinghouse Hanford EEG will have overall responsibility for planning and controlling the IRA activities, providing effective technical, cost, and schedule baseline management. The management control system used for this project must meet the requirements of DOE Order 4700.1, Project Management System (DOE 1987), DOE Order 2250.1B, Cost and Schedule Control, and Systems Criteria for Contract Performance Measurement (DOE 1985). The Westinghouse Hanford Management Control System (MCS) meets these requirements. The primary goals of the Westinghouse Hanford MCS are to provide methods for planning, authorizing, and controlling work so that it can be completed on schedule and within budget, and to ensure that all planning and work performance activities are technically sound and in conformance with management and quality requirements.

The IRA schedule and major milestones are presented in Section 7.0. The schedule will be the primary guidance for the regulators, DOE, and the technical lead to track the progress of the IRA.

MEETINGS AND PROGRESS REPORTS

The regulators, DOE, and Westinghouse Hanford participate in open discussions during weekly meetings to resolve issues related to the status of the IRA. These meetings provide a continuing dialogue with the regulators. The status of the IRA will be presented at ongoing unit managers meetings concerning the IRA. In Addition, a progress report will be prepared and submitted to the EPA, DOE-RL, and DOE at the end of each fiscal year.

REFERENCES

DOE, 1985, *Cost and Schedule Control Systems Criteria for Contract Performance Measurement*, DOE Order 2250.1B, U.S. Department of Energy, Washington, D.C.

DOE, 1987, *Project Management System*, DOE Order 4700.1, U.S. Department of Energy, Washington, D.C.

Ecology et al. 1989, *Hanford Federal Facility Agreement and Consent Order*, Washington Department of Ecology, U.S. Environmental Protection Agency, and Department of Energy, Olympia, Washington.

WHC, 1988, *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7, Westinghouse Hanford Company, Richland, Washington.

DRAFT

ATTACHMENT 4

DATA MANAGEMENT PLAN

INTRODUCTION

This data management plan (DMP) addresses management of data generated from the 200 West Area Carbon Tetrachloride Interim Response Action (IRA) project activities.

A considerable amount of data will be generated through the implementation of the IRA project plan and attachments. The quality assurance project plan (QAPP) provides the specific procedural direction and control for obtaining and analyzing samples in conformance with requirements to ensure quality data results. Chapter 4.0 provides the detailed logistical methods to be employed in selecting the location, depth, frequency of collection, etc., of media to be sampled and the methods to be employed to obtain samples of the selected media for cataloging and analysis.

Development of a comprehensive plan for the management of all environmental data generated at the Hanford Site is under way. The *Environmental Information Management Plan* (EIMP) (Steward 1989), released in March 1989, describes activities in the Environmental Data Management Center (EDMC) and provides a description of the long-range goals for management of scientific and technical data.

The Project Lead is responsible for maintaining and transmitting data to the designated storage facility.

TYPES OF DATA

SITE EVALUATION DATA

General data types generated by Phase I site evaluation tasks (Chapter 4.0) include field logbooks, screening data, verified sample analyses, historic data, quality assurance/quality control data, reports, memoranda/meeting minutes, telephone conversations, raw sample data, videotapes, magnetic media and supporting documentation, and chart recordings. Collection and handling of these data are governed by environmental investigations instruction (EII) 1.6, Records Management (WHC 1988), and those task-related procedures listed in the QAPP. The data will be stored in project files or in the EDMC, as appropriate.

The EDMC is the Westinghouse Hanford Environmental Division's central facility that provides a file management system for processing environmental information. All data entering the EDMC is indexed, recorded, and placed into safe and secure storage. The EDMC manages and controls the administrative record and the Administrative Record Public Access Room. The administrative

record provides an index and key information on all data transmitted to the EDMC. Data designated for placement into the administrative record will be copied, placed into the Hanford Site Administrative Record File, and distributed by the EDMC to the user community.

Data transmittal to the EDMC is governed by the following procedures:

- EII 1.6, Records Management (WHC 1988)
- TPA-AP-06-R0, Predecisional Draft, "Clearance and Release of Administrative Record Documentation" (DOE-RL et al. 1990a)
- TPA-AP-07-R0, Predecisional Draft, "Information Transmittals and Receipt Control" (DOE-RL et al. 1990b)
- TPA-AP-10-R0, "Administrative Record Management" (DOE-RL et al. 1990c)
- WHC-EP-0219, *Environmental Information Management Plan* (Steward 1989).

Information Resource Management is the designated records custodian (permanent storage) for Westinghouse Hanford.

The Pacific Northwest Laboratory (PNL) operates the Hanford Meteorological Station that collects and maintains meteorological data. This database contains meteorological data dating from 1943 to present. Data management is discussed in the Hanford Meteorological Data Collection System and Data Base (Andrews 1988).

ADMINISTRATIVE DATA

Related administrative data include personnel training records, exposure records, respiratory protection fitting records, personnel health and safety records, and compliance and regulatory data.

The Hanford Environmental Health Foundation (HEHF) performs the analyses on the nonradiological health and exposure data and forwards summary reports to the Fire and Protection Group and the Environmental Health and Pesticide Services Section within the Westinghouse Hanford Environmental Division. Nonradiological and health exposure data are maintained also for other site contractors who may be involved in IRA activities. The HEHF provides summary data to the appropriate site contractor. HEHF also maintains personal health and safety records. The preparation of health and safety plans and the resulting data records are addressed in EII 2.1, Preparation of Hazardous Waste Operations Permits (WHC 1988) and occupational health monitoring is covered in EII 2.2, Occupational Health Monitoring (WHC 1988).

The Westinghouse Hanford EHPSS maintains personal protection equipment fitting records and maintains nonradiological health field exposure and exposure summary reports provided by HEHF for Westinghouse Hanford Environmental Division and subcontractor personnel.

Training records for Westinghouse Hanford and subcontractor personnel are managed by the Westinghouse Hanford Technical Training Support Section. Other Hanford Site contractors (PNL and KEH) maintain their own personnel training records.

The PNL collects and maintains data on occupational radiation exposure. This database contains respiratory personnel protection equipment fitting records, work restrictions, and radiation exposure information. Data management is discussed in the Hanford Meteorological Data Collection System and Data Base (Andrews 1988).

Compliance and regulatory data is maintained by the EMDC. Procedures governing data transmittal are listed in DMP Section 2.1

DATA QUANTITY

Data quantities are described in the project plan and the FSP.

ENVIRONMENTAL INFORMATION MANAGEMENT PLAN

The EIMP (Steward 1989) was issued is March 1989 and is currently under review. The first part of the EIMP provides an overview of the Westinghouse Hanford Environmental Division's working files management system and addresses the management of information transmitted to the EDMC, the Environmental Division's designated file manager, in support of Environmental Restoration Program activities. An overview is presented of the EDMC's location, operating mechanics, field file support services, automated support services, and the composition and compilation of an agency-required Administrative Record.

The second part of the EIMP addresses future plans for management of scientific and technical data. The planning and control activities affecting data are discussed. These activities include data collection, analysis, integration, transfer, storage, retrieval, and presentation.

REFERENCES

Andrews, G.L. (1988), *Hanford Meteorological Data Collection System and Data Base*, PNL-6509, Pacific Northwest Laboratory, Richland, Washington.

DOE-RL, EPA, and Ecology (1990a), *Clearance and Release of Administrative Record Documentation*, Predecisional Draft, TPA-AP-06-R0, U.S. Department of Energy-Richland Operations Office, U.S. Environmental Protection Agency, and Washington State Department of Ecology, Richland, Washington.

DOE-RL, EPA, and Ecology (1990b), *Information Transmittals and Receipt Control*, Predecisional Draft, TPA-AP-07-R0, U.S. Department of Energy-Richland Operations Office, U.S. Environmental Protectional Agency, and Washington State Department of Ecology, Richland, Washington.

DOE-RL, EPA, and Ecology (1990c), *Administrative Record Management*, Predecisional Draft, TPA-AP-10-R0, U.S. Department of Energy-Richland Operations office, U.S. Environmental Protection Agency, and Washington State Department of Ecology, Richland, Washington.

Steward, J.C. (1989), *Environmental Information Management Plan*, WHC-EP-0219, Westinghouse Hanford Company, Richland, Washington.

WHC (1988), *Environmental Investigations and Site Characterizations Manual*, WHC-CM-7-7, Richland, Washington.

DRAFT

ATTACHMENT 5

COMMUNITY RELATIONS PLAN

A Community Relations Plan (CRP) has been developed for the Hanford Site Environmental Restoration Program and is applicable to the 200 West Area Carbon Tetrachloride Interim Response Action (IRA). The CRP provides continuity and general coordination of all the Environmental Restoration Program activities with regard to community involvement. The site-wide CRP discusses Hanford Site background information, history of community involvement at the Hanford Site, and community concerns regarding the Hanford Site. It also delineates the community relations program that the U.S. Department of Energy-Richland Operations Office, the U.S. Environmental Protection Agency-Region 10 Office, and the Washington Department of Ecology will cooperatively implement throughout the cleanup of all the operable units at the Hanford Site. All community relations activities associated with the 200 West Area Carbon Tetrachloride IRA will be conducted under this overall Hanford Site CRP.

The public will have a 30-day period to review and comment on the formal IRA Proposal for the 200 West Area Carbon Tetrachloride IRA. In addition, the public will be informed on the progress of the IRA through quarterly public meetings, a project fact sheet, and will also have access to the official administrative record file for the IRA project.

EXHIBITS

United States
Environmental Protection
Agency

Region 10
Hanford Project Office
712 Swift Boulevard, Suite 5
Richland WA 99352

EPA

December 20, 1990

Steven H. Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550, A6-95
Richland, Washington 99352

Ref: 200 West Area Carbon Tetrachloride Interim Response Action

Dear Mr. Wisness:

The United States Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) have reviewed the Interim Response Action (IRA) proposal for the 200 West Area Carbon Tetrachloride IRA enclosed with your December 6, 1990 letter. Based on the information provided, we believe that early action could successfully limit the further spread of carbon tetrachloride vapors in the unsaturated zone beneath the 200 West Area and intercept much of that material prior to entering the groundwater. We encourage you to proceed with detailed planning, including non-intrusive field work that is required to implement this action. Since the 200 West Area carbon tetrachloride plume emanates from the 200-ZP-1 Operable Unit and EPA is the lead regulatory agency for that unit, EPA will be the lead agency for this IRA and Ecology will be the support agency.

A final proposal for this action is required and must include sufficient information for us to develop an Action Memorandum. The Action Memorandum will be the mechanism for approving the start of IRA field work.

EPA and Ecology believe the current proposal schedule, as presented, could be shortened by implementing the removal action in a phased approach. It appears that existing structures, principally vadose zone monitoring wells, could be modified to extract vapors or inject air to enchance carbon tetrachloride recovery. This action could be initiated at one of the primary sources to evaluate recovery efficiency, air injection and withdrawal rates as well as other process design data. This information would provide valuable data to increase removal efficiency and locate additional vapor extraction and recovery wells, and will allow for flexibility in final design of the IRA project.

An Engineering Evaluation/Cost Assessment (EE/CA) for this project is required. Of particular concern, is the treatment of the vapors extracted and the treatment or recovery alternatives to be evaluated in the EE/CA. Implementation of this IRA does not represent a final solution to the carbon tetrachloride problem, but it may, in fact, make that final solution attainable. In other words, we consider this IRA to be consistent with the likely-preferred alternative(s) for carbon tetrachloride remediation at this point in time.

It is important that we develop a meaningful public involvement process for this action that would begin in the near future. As part of this effort, we suggest that a fact sheet be prepared for this IRA to be used at the next Tri-Party quarterly meeting schedule for mid-January. Additionally, we are requesting a project description to be submitted on the IRA no later than January 9, 1991.

According to the October 18, 1990 Agreement in Principle, the funding for this project is in addition to that identified to meet previously identified activities required by the Tri-Party Agreement.

If you have any questions on the above, please do not hestitate to contact either one of us. Additionally, we intend to maintain regular staff interaction, allowing for early identification of issues or concerns.

Sincerely,

Douglas R. Sherwood for

Paul T. Day
Hanford Project Manager
U.S. Environmental Protection Agency

L L Goldstrom for

Timothy L. Nord
Hanford Project Manager
Washington State Department of Ecology

cc: Willis Bixby, DOE
Roger Stanley, Ecology

9112070316

AGREEMENT IN PRINCIPLE
Between the United States Department of Energy,
the United States Environmental Protection Agency,
and the State of Washington

THIS AGREEMENT is entered into between the United States Department of Energy (DOE), the United States Environmental Protection Agency (EPA), and the State of Washington.

WHEREAS, the parties to this AGREEMENT have previously entered into the Hanford Federal Facility Agreement and Consent Order on May 15, 1989, (Tri-Party Agreement) to provide for the coordinated efforts of all parties to assure compliance of DOE Hanford Site activities with requirements of the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), including corrective actions and remedial actions required by those Acts, and applicable state law; and

WHEREAS, the parties have pursuant to RCRA, CERCLA and the Tri-Party Agreement instituted the process of conducting CERCLA remedial investigations and feasibility studies (RI/FS) and RCRA facility assessments and corrective measures studies (RFI/CMS) of operable units on the Hanford Site; and

WHEREAS, the parties are desirous of taking immediate steps to accelerate the physical restoration of the Hanford Site prior to completion of RI/FS and RFI activities through performance of expedited response actions;

NOW, THEREFORE, DOE, EPA, and the State of Washington agree as follows:

1. That each party reaffirms its commitment to the Tri-Party Agreement.

2. That USDOE reaffirms its obligations and commitment to seek sufficient funding from Congress to meet all existing milestones in the Tri-Party Agreement and future new milestones or revised milestones established by agreement of the parties in accordance with Article XL of the Tri-Party Agreement.

3. DOE has identified a list of potential Hanford Site projects which may be considered for expedited response actions. Candidate projects under consideration for expedited response actions, include, but are not limited to:

   a. 618-9 Burial-Ground Remediation
   b. 300 Area Process Trenches Sediment Removal
   c. 200 West Area Carbon Tetrachloride Treatment.

4. DOE will propose the selected projects to Ecology and EPA for their review of the technical basis, costs and feasibility for these projects. The three parties will jointly propose to the public those projects if they meet regulatory approval. The three parties will follow the public involvement procedures of the Tri-Party Agreement and the CERCLA National Contingency Plan.

5. Following regulatory and public review, DOE commits to implementing these three candidate projects, or other appropriate projects from the list, pursuant to a schedule agreed upon by the three parties. DOE commits to the implementation of these projects as additions to the Tri-Party Agreement and without an impact on the existing milestones of the Tri-Party Agreement.

6. In order to understand the total activities under consideration and to establish a baseline for the activity which can be used as a basis for decisions and against which progress can be measured, the initial step for each of the potential projects is the development of a detailed cost estimate based upon that plan.

7. These activities will be conducted in a manner consistent with prudent management and will serve as a model for future activities in the Environmental Restoration and Waste Management Program.

8. The parties will use their best efforts to complete the steps identified in the foregoing paragraphs as soon as practical.

NOW, THEREFORE, the parties hereto have signed this AGREEMENT in recognition of their pledge of mutual best efforts to achieve through cooperation and negotiation, in good faith, the understandings as set forth above on this 18th day of October, 1990.

James D. Watkins
Secretary of Energy

William Reilly, Administrator
U. S. Environmental Protection Agency

Honorable Booth Gardner, Governor
State of Washington

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

90-ERB-194 December 6, 1990

Mr. Paul T. Day
Hanford Project Manager
U. S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

Mr. Timothy L. Nord
Hanford Project Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

Dear Messrs. Day and Nord:

INTERIM RESPONSE ACTIONS

Enclosed are the proposed interim response action (IRA) summary packages which were presented and discussed in the November 26, 1990, meeting on this subject. Based on the discussions in the meeting, the schedules have been reviewed and the following modifications made:

- The analyses for site evaluation are assumed to be Contract Laboratory Program (CLP) Level II, field screening. This assumption reduces the critical path by four weeks for two of the IRAs.

- The overall durations for preparation and approval of IRA proposals have been reduced by four to five weeks of review time and two weeks of revision time. This schedule reduction requires that Westinghouse Hanford Company, U. S. Department of Energy, Richland Operations Office, U. S. Environmental Protection Agency (EPA), Washington State Department of Ecology (Ecology), and the public all review the document in parallel.

At the November 26th meeting, EPA requested that an additional cost and schedule estimate be prepared for excavating the 300 Area Process Trenches and placing the soil in the North Pond as an alternative to the proposal in the summary package of treating the contaminated soil. It is estimated that this removal and storage action could be accomplished within one year of approval to proceed, and would cost approximately $2 million. The main assumption for this alternative is that the lead regulatory agency (EPA) would provide the necessary waivers and/or variances required to place the materials in the North Pond. An additional assumption is that there would be no undue delay in obtaining any required permits to conduct the removal activities. The

material would be excavated while the trenches are still in operation. This could require temporary restrictions in the amount of effluent discharged to the trenches for a limited time.

Since the November 26th meeting, a number of discussions have taken place with EPA regarding additional acceleration of schedules, including the need to "take time critical actions." We would appreciate receiving specific, formal direction regarding schedules and actions not included in the enclosed summary packages, e.g. conduct of the "removal/storage action for the 300 Area Process Trenches."

The funding required in Fiscal Year 1991 to initiate the four IRAs as proposed in the summary packages is as follows:

1.	618-9 Burial Ground	5.0 M
2.	200-W Area Carbon Tetrachloride	3.7 M
3.	300 Area Process Trenches	$ 1.0 M
4.	N-Springs Groundwater Contamination	9.0 M

Rough Order-of-magnitude cost estimates are included in each of the IRA summary packages.

To maintain the schedules in the enclosures, approval by EPA and Ecology on the selection of IRAs on which to proceed is required by December 7, 1990. Additionally, as noted above, specific direction is requested regarding further acceleration and/or substantive change in scope.

If you have any questions, please call Ms. Julie Erickson at (509) 376-3603, or Mr. R. K. Stewart at (509) 376-6192.

Sincerely,

Steven H. Wisness
Hanford Project Manager

ERD:RKS

Enclosures: As stated.

cc w/encl:
J. V. Antizzo, EH-232
J. C. Lehr, EM-442
Administrative Record
Public Repositories (encl. by WHC)

cc w/o encl:
W. L. Johnson, WHC
R. E. Lerch, WHC
T. M. Wintczak, WHC
T. B. Veneziano, WHC

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Mail Stop PV-11 • Olympia, Washington 98504-811 • (206) 459-6000

December 12, 1990

Mr. Steve Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550
Richland, Washington 99352

Re: Hanford Interim Response Action Preliminary Proposals

Dear Mr. Wisness:

The following comments address the Hanford Interim Response Action Preliminary Proposals dated November 26, 1990, the DSI entitled "Expedited Response Action (ERA) Summary Packages" dated November 30, 1990, and the December 6, 1990 letter to Ecology and EPA referencing "Interim Response Actions".

As you know, Ecology has advocated and continues to support the goal of identifying candidate sites at Hanford for interim remedial actions. It was encouraging to learn that USDOE and EPA met in late September and early October to discuss this issue. It appears these meetings were productive, and have lead toward progress being made.

The parties to the Hanford Federal Facility Agreement and Consent Order are now at an important juncture in setting precedent for remedial activities at Hanford. We believe it is critical these activities are: 1) environmentally justified; 2) protective of human health; 3) technically correct; and 4) consistent with federal and state regulations, and the Agreement. The remainder of this letter documents general and specific concerns we have with the proposals that should be addressed prior to submittal of the formal proposals.

General Comments

- The IRA selection process is subjective. The parties should agree upon a decision-making process that is consistent with the Agreement and the Hanford Past Practice Strategy. This process must include a methodology, criteria, quantification of the criteria and final evaluation.

The annotated outline in the proposal package notes in Section 4.0 that "the types of evaluation criteria utilized will be based on the EPA's 'Nine criteria for evaluation as listed in 40 CFR Part 300.430'." The criteria are presented, but the entire text is vague. How will these criteria be evaluated, applied and quantified?

We recommend using CERCLA and RCRA guidance and criteria to develop a single process for Hanford past practice sites. Most important, the agencies must agree what criteria will be used, and how those criteria will be quantified in order to provide a consistent, technically defensible process for defining potential areas needing interim action at Hanford.

The introduction references seven sites originally considered in the selection process. There is no mention for the record now or in the future, of how the three (four?) proposed projects were given a higher priority, and what sites are being deferred for further consideration. The original options need to be addressed. In addition to those sites deferred, Ecology believes additional sites to be reviewed in the near future should include, for example, the "pluto" cribs in the 100-HR-3 Operable Unit e.g., 116-D-2, and the cyanide plume associated with the 200-BP-1 Operable Unit.

o The proposals should address how schedules/milestones will potentially be affected. The fact that concurrence of all project managers would be required in accordance with Section 7.2.4. of the Agreement should be presented. For example, removal action in the 300 Area trenches must be discussed in terms of meeting existing milestones. The proposal for pump and treatment of ground water in the 100-N Area should reference potential impacts on planned geohydrological studies.

o The November 30 and December 6 cover letters propose a 30-day <u>parallel</u> review period. We do not see the advantages in proposing remedial activities to the public prior to the agencies agreeing on priorities, and the best course(s) of action. This process could raise substantial questions by the public that the agencies could have difficulty in providing clear answers. At this time, Ecology will not review and approve an IRA proposal that has not had prior approval by USDOE. Ecology recommends adherence to requirements set forth in the NCP and the Agreement.

The review periods for the public must be consistent among all proposals.

Specific Comments

These comments are not intended to be inclusive of all concerns, but serve as examples of issues that should be addressed in the final IRA proposals.

618-9 BURIAL GROUND

- There is no evidence of leakage, and the drums may be structurally sound as to preclude the need for immediate pumping. However, pumping appears to have been determined necessary before adequate site characterization has occurred. The text should be modified.

- The site evaluation includes exposing and pumping out the drums, although the site evaluation would be completed prior to regulatory approval (Section 4.5). However, Section 4.3.4 states that removing liquids from the drums would be part of implementation of the IRA, which would require regulatory approval. The latter is correct, and the former is not, i.e., pumping the drums prior to regulatory approval is contrary to the Agreement and CERCLA.

N-SPRINGS GROUNDWATER

- We concur the N-Springs discharge represents one of the most serious environmental threats emanating from the Hanford Site, and support interim remedial action at this site. However, the measure of remedial success needed, and the ability to meet those objectives using pump and treat technology must be assessed. Contaminants other than Strontium-90 that can be removed using an ion exchange column should be addressed.

300 AREA PROCESS TRENCH

- Continued discharge after excavation might cause further environmental degradation. This point should be addressed in the proposal.

- The depth and extent of contamination in the trenches is poorly defined, and the measure of success desired in removal actions has not been addressed. Therefore, the volume of excavation needed is unknown, and the anticipated degree of remediation cannot be determined. These questions cannot be answered without further study, but the proposal text does not reflect these uncertainties. In fact, a proposal of $1.0 M dollars has been tentatively allocated for this remedial action with little explanation of what is to be accomplished.

- It is assumed in Section 4.4.3 that this IRA would be conducted as a CERCLA activity under EPA lead, although the trenches are a RCRA interim status facility. The state has jurisdiction over waste removed from the trenches, and this fact should be noted in the proposal.

- Section 4.1 states the proposed action is not expected to interfere with remedial activities within the 300-FF-1 Operable Unit. However, it was stated at the December 3, 1990 Interim Response Actions meeting held in Richland that dredging the trenches and placing the excavated sediments in the North Pond was considered a viable and attractive option. Placement of large volumes of wastes in the North Pond would certainly affect operable unit remedial activities.

- The North Pond alternative will not meet the reduction of waste measure of success identified in Section 4.2 of the proposal.

- It is not clear in the proposal where 1000 cu. yd. of dry waste, 4000 drums of hazardous waste, and 4000 drums of mixed waste will be stored or treated. There should be at least several options presented at this point in the process.

200-W CARBON TETRACHLORIDE

- The proposal should discuss more fully the potential to address ground water contamination in addition to vadose zone contamination. Why, for example, is ground water remediation deemed to complex due to the presence of radioactive contaminants?

- The criteria for discontinuing treatment is ill-defined in Section 4.4.4. and should be expanded.

We look forward to the meeting scheduled for December 14, 1990 in Kennewick in order to discuss the IRA program in general, and our concerns in particular. If you have questions before then, please contact Larry Goldstein at (206) 438-7018.

Sincerely,

Timothy L. Nord
Hanford Project Manager
Nuclear & Mixed Waste Management

cc: Roger Stanley
Paul Day, EPA
Tim Veneziano, WHC

DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
SH Wisness/DOE-RL	PT Day/USEPA	Incoming: 9100241

Subject Expedited Response Action (ERA) - Project Descriptions

Internal Distribution

Approval	Date	Name	Location	w/att
		Correspondence Control		X
		President's Office		
		MR Adams	H4-56	X
		BA Austin	B2-14	X
		LC Brown	H4-51	X
		KR Fecht	H4-56	X
		VW Hall	L4-88	X
		KL Hoewing		X
		WL Johnson	H4-55	X
		KR Jordan		X
		RE Lerch (Assignee)		X
		HE McGuire		X
		K Parnell	H4-18	X
		LL Powers	B2-35	X
		TB Veneziano	B2-35	X
		TM Wintczak	L4-92	X
		RD Wojtasek	L4-92	X
		EDMC	H4-22	X
		TPAI File (DH)	B2-35	X
		MC Hagood	H4-56	X
		WF Heine	B2-35	X
				X

DISTRIBUTION CORRECTIONS SHOULD BE SENT OR CALLED TO MARIAN CRAM A3-01 6-4123 or CC Mail